Steelmaking and Steel Fabricating Potentials in Georgia and the Southeast

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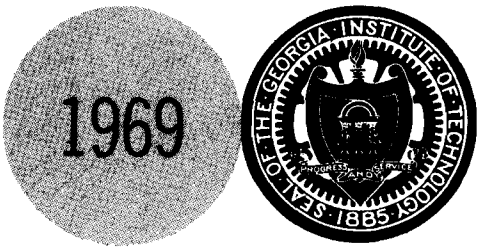

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Engineering Experiment Station
GEORGIA INSTITUTE OF TECHNOLOGY
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Foreword

This latest report of a series which identifies manufacturing opportunities in Georgia is highly significant. It analyzes the potentials of a relatively underdeveloped industry in the Southeast. The manifestation of this underdevelopment is the need to import more than one-half the steel used in the region each year.

Twenty-nine different steel fabricating industries are identified as being manufacturing opportunities in Georgia by this study. This report, by identifying the southeastern market potential for steel and specific fabricated steel products, highlights the profit opportunities in the manufacturing field.

The steel industry is of great importance to the future welfare of the Georgia economy, since it contains the promise, when fully developed, of materially bettering the per capita income of the state. As has been pointed out in other IDD reports on the state of the Georgia economy, it is extremely desirable to acquire more sophisticated, technically oriented manufacturing plants such as are found in the metalworking, machinery, and transportation industries. If the Georgia per capita income can be made to converge on the U. S. average, it will be due to the superimposing of these types of industries on the present industrial base.

Your comments and suggestions on this report are solicited.

Ross W. Hammond, Chief
Industrial Development Division
GEORGIA INSTITUTE OF TECHNOLOGY

Acknowledgments

In the process of making this study, numerous persons and institutions were contacted and consulted, and it would be impossible to mention by name all of those involved. The authors gratefully express their appreciation to all those who contributed their time, experience, and information to this study program. In particular, they would like to acknowledge the assistance of the following:

Messrs. L. Glenn Dewberry, Jr., H. F. McCarley, Ike Burch, and Cameron Sevier, Jr., of the Atlantic Steel Company, were consulted from the beginning of the study. They gave generously of their time, advice, and materials in the course of this program.

The American Iron and Steel Institute sent large volumes of statistical data, as well as literature concerning the U. S. steel industry. Although many people with the Institute were contacted, the help of Messrs. Kenneth C. Allen and Bertis E. Capehart is especially acknowledged here.

Iron Age magazine provided several volumes of "Metalworking Marketguide" free of charge. These publications proved to be valuable in working out the regional distribution of various metalworking industries.

Mrs. Eve Blewitt, promoter of a continuous casting steel plant in Georgia, exchanged freely her knowledge and experience with the authors.

Mr. W. G. Cornell, of the Southern Railway System, was consulted from time to time concerning the freight rates for steel mill products. He was quite helpful in working out freight data for the authors.

The Atlanta regional offices of several steel corporations provided assistance on various questions concerning steel production and marketing. Contacted were United States Steel Corporation, Armco Steel Corporation, Jones and Laughlin Steel Corporation, and Wheeling Steel Corporation.

Mr. R. O. Denman, president of Strategic-Udy Processes, Inc., lent a copy of his firm's study of the feasibility of a steel plant in Georgetown, Georgia. Although the plant has not materialized, the study pointed out the potentials for utilizing Georgia ores in making steel.

Dr. A. S. Furcron, director of the Georgia Department of Mines, Mining and Geology, gave a general review of the Georgia iron ore mining situation. Publications from his department also were helpful to this study.

Last but not least, the authors want to express their gratitude to Mr. Leon Kilbert, head of the Research Department, Lionel D. Edie & Company, and to Mr. Frank J. Leber, market analyst, Commercial Research Division, Inland Steel Company, for reviewing this report in draft form. Their comments and suggestions were most valuable and are gratefully acknowledged.

Summary

The U. S. steel industry, in its justifiable concentration of effort on meeting the strong competition from foreign steelmakers by investing in the newest and most advanced technological processes, may be overlooking the cost advantages of serving some of the smaller, but rapidly growing steel-deficit areas of the nation by dispersing its production facilities more widely into these regions. The six-state Southeast used 7.4 million net tons of steel mill products in 1967, more than 4 million tons of which had to be shipped in from northern mills or from abroad. Area consumption is expected to grow at a rate of more than 350,000 tons a year until 1970 and by even larger increments thereafter. This market can be exploited by large, established companies, by smaller, local firms, or by foreign steel producers which can establish steel mills based on local scrap, imported ores, and possibly local ores.

The U. S. Steel Industry

The increasing prosperity and industrialization of the United States can be measured by growth in raw steel production, for steel is a basic and essential ingredient of the American economy; between 1900 and 1967, steel ingot production increased by more than 1,000% compared with a 160% increase in the U. S. population. In recent years, U. S. consumption of steel mill products has risen more rapidly than shipments from domestic producers because imports have mushroomed while exports have decreased. The United States became a net importer of steel products in 1959 and has remained so ever since. However, a forecast made for this study assumes that imports will hold fairly steady in the future, due either to an extension of the current voluntary agreement with foreign producers or to imposition of import quotas, and that shipments of domestic products will continue to increase at the normal rate of 2% a year.

Year	Steel Ingot Production	Steel Products			
		Shipments	Exports	Imports	Consumption
1954	88,312,000	63,153,000	2,792,000	771,000	61,132,000
1967	127,213,000	83,897,000	1,685,000	11,454,000	93,666,000
1980	166,000,000	116,000,000	4,000,000	16,000,000	128,000,000

Competition from technologically advanced foreign steelmakers and from substitute materials such as aluminum and plastic has stimulated the U. S. steel industry in recent years to invest billions of dollars on plant modernization

and the installation of new and improved processes to upgrade the quality, strength, and versatility of steel and to cut down production costs. These developments include giant pelletizing plants to beneficiate low-grade iron ore, a strong shift toward basic oxygen furnaces, computer-controlled rolling mills, refining of steel by vacuum melting and vacuum degassing, continuous casting, and a swing to electric furnaces.

Along with this emphasis on investment in new technology, the U. S. steel industry should not overlook the competitive advantages of establishing additional branch production capacity oriented to the smaller, but rapidly expanding regional markets. Historically, regional dispersion and expansion of the U. S. steel industry were greatly hampered by the "Pittsburgh-plus" and multiple basing-point pricing systems which gave the traditional steel-producing areas an artificial economic advantage in selling to the national market. Even under the freight equalization practice generally followed today, established steel firms still have a minimal incentive to disperse their facilities into steel-deficit regions such as the South.

Nevertheless, raw material advantages and the rising demands resulting from rapid regional industrialization have enabled other steel centers to grow at the expense of the traditional steel cities, Pittsburgh and Youngstown, over the past two decades. The greatest growth was shown by Detroit, which tripled its steel ingot output between 1947 and 1965; St. Louis and Cincinnati more than doubled, and the Southern and Western regions nearly doubled their production. Chicago's 54% growth during the period kept pace with the national average, but the tempo of expansion has increased there since 1965. The city has taken Pittsburgh's place as the leading steel city since 1960. Pittsburgh and Youngstown registered a mere 11.5% increase in ingot production over the period.

Steel Supply and Demand in the Southeast

The market for both domestic and imported steel mill products is growing rapidly in the six-state Southeast -- Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee. In 1967, the area used 7.4 million tons of steel, an estimated 6.3 million tons of which were produced in U. S. mills. Less than one-half of the total demand was supplied by producers in the area.

Consumption of domestic steel mill products in the area increased at a rate three times as fast as in the nation as a whole between 1960 and 1967;

the area's share of U. S. demand rose from 4.9% in 1960 to 6.4% in 1967. The area registered a startling increase in demand for alloy steel -- seven times that of the nation -- while the demand for carbon and stainless steel products maintained the overall 3:1 area-nation growth ratio.

Imports of steel mill products have provided substantial competition to domestic producers in serving the southeastern market for many years, long before the volume of imports became a problem nationwide. The six-state area's imports totaled 1,082,759 tons in 1967, over 2½ times the 1960 volume; they constituted 16.8% of total consumption in the area in 1967 as opposed to 10.8% in 1960. During the same period, U. S. imports rose from 4.7% of consumption to 12.2%.

By 1975, demand for domestic steel mill products in the six-state area is expected to reach 8.3 million tons, 1½ times the 1967 reported demand of 5.4 million tons (approximately 85% of estimated total demand). By 1980, the area market should be 10.5 million tons, nearly double the 1967 partial demand and representing a projected 9% of the U. S. total. Carbon steel's share of the six-state market is estimated to dip to 77% in 1980, while alloy steel is expected to continue its meteoric growth, rising to 21% of the area total. Stainless steel is projected to represent 2% of the area market in 1980. Demand for all three grades of steel will grow more rapidly in the area than in the nation as a whole.

The burgeoning demand comes from the area's large and growing steel fabricating complex. Employment in the area's fabricating plants more than doubled in the 1957-1967 decade, reaching a total of nearly 500,000 workers in about 2,000 plants -- nearly three times the percentage increase in employment recorded for the nation. Of nine major steel fabricating industry groups, all except ordnance and primary metals experienced much greater growth in the six states than in the U. S. In contrast, the area's total primary metals industry increased employment by only 4.5% during the 10-year period.

There is a wide and growing gap between the raw material needs of steel fabricating industries in the six-state area and the ability of southeastern steelmakers to supply this demand. Even if local producers operated at full capacity, which they generally do not, they would fall far short of meeting the current needs of the area. As it is, they produce on the order of 3 million net tons for the area market.

Consequently, the steel buyers in the area must bring in about 4 million tons of finished steel mill products from distant northern mills or from abroad. This exploitable market is expected to grow by 352,000 tons annually until 1975, and by even larger average annual increments in succeeding years.

Georgia's Position for Serving the Southeastern Market

Georgia has at least three major advantages as a location for additional facilities to meet the demands of the rapidly expanding southeastern market -- lower freight costs, faster delivery, and lower labor costs than are found at major steel producing centers. Millions of dollars can be saved in shipping costs by just one plant with an output of 400,000 tons of steel mill products.

As an illustration of Georgia's strategic distribution position, 1963 data indicate that Georgia has nearly one-fourth of the six-state area's metal service centers and that these establishments account for almost one-third of the dollar volume of sales in the area. One of the state's major assets is its excellent transportation network which can efficiently serve the southeastern market.

Georgia's lower labor cost potential is predicated not only on the generally lower wage level in the area, but also on less extensive fringe benefit requirements, more flexible job classification practices, and the potential for higher worker productivity. Other labor advantages include excellent labor-management relations with little work stoppage, a pool of available workers, and a statewide program of training services.

Possibilities for establishing steel mills in Georgia are three: a mill with electric furnaces and continuous casting facilities and utilizing scrap, a facility in a port area using imported ores, and a mill based on local ores (although the extent of the tonnage available in Georgia is currently unknown).

Georgia also would offer steel producers a climate of general economic well being and rapid growth in which to operate. Analysis of a variety of economic indicators shows that Georgia and the five bordering states which constitute the state's natural market area are growing more rapidly than is the United States as a whole. This burgeoning economic base ultimately will lead to the establishment of additional steelmaking facilities in the state.

Steel Fabricating Opportunities for Georgia

Twenty-nine steel fabricating industries were preliminarily identified as manufacturing opportunities in Georgia. These industries are discussed in detail in the final chapter of the report.

INTRODUCTION

Background

The impetus for conducting this study was provided by a recognition of several significant changes in the steel industry as well as the dynamic growth of the southeastern part of the United States. The South is no longer a "cotton-tobacco country" with the majority of people depending on farming as their livelihood. Today, the region is bustling with trade and manufacturing activity. The Southeast, in fact, is one of the fastest growing industrial areas in the nation.

The changes occurring in the steel industry have been rapid and fascinating. The industry has worked vigorously to adapt itself to the changing economic conditions of the nation and the world. The changes have taken place in steelmaking technology, geographical distribution of plants, the pricing system, and market organization. These changes have created a new outlook for the steel industry.

The original plan for this study, which called for an extensive study of the steel industry in 11 southeastern states, was dropped because of financing problems. The current study has a smaller scope and is confined to Georgia and its five neighboring states -- Alabama, Florida, North Carolina, South Carolina, and Tennessee.

Objectives

The main purpose of this study is to provide basic information concerning the steel industry and its related industries in the Southeast to entrepreneurs with an interest in the region. Through the systematic presentation of facts and figures and an in-depth analysis of available data, this study is intended to project a clear picture of the steel industry in the Southeast and to spotlight opportunities offered in the region.

The study also has several more specific objectives:

1. To provide reasonably accurate data on consumption of both domestic and imported finished steel mill products in the six southeastern states.
2. To project the demand for basic steel products in the six-state area to 1975 and to 1980.

3. To study the supplies of basic steel products in the six-state area.
4. To spotlight manufacturing opportunities existing in basic steel manufacturing and steel fabricating in the six-state area.
5. To analyze Georgia's potential for realizing these opportunities.
6. To review systematically the major trends of the U. S. steel industry.

Scope

This study consists of four main sections. The first part provides a background review of the U. S. steel industry. Included are the status of the steel industry in the American economy; statistics concerning production, shipments, imports, exports, and consumption of basic steel from 1945 to 1968; steel outlook and projections; major market outlets; new technology and investments; pricing structure and regional development; and finally, regional trends in steel production.

The second part discusses the steel market in the six southeastern states in terms of demand and supply. Included are data on area demand for domestic steel mill products, imports by custom districts, steel fabricating industries in the area, capacity of steelmaking facilities in the area, and the supply-demand deficit.

Georgia's potential for realizing opportunities offered in the steel industry is analyzed in the third part. Included are data on freight costs and delivery time, labor costs and availability, sources of raw materials, and an analysis of the growing economic base of Georgia and bordering states.

The fourth part identifies 29 manufacturing opportunities in the following steel using or steel fabricating industries: commercial forgings, ball and roller bearings, household appliances, metal office furniture, selected fabricated metal products, selected nonelectrical machinery, selected transportation equipment, selected instruments and photographic equipment, and metal toys and games. Maps showing the locations of major producers in these industries are used extensively. Brief information on each industry is included.

It should be noted that this study is concerned primarily with the steelmaking and steel fabricating industries. Production of iron and iron products and coal and coke is not discussed.

General Approach

Information and data obtained for this study came from every available source -- from public and private sources and from published and classified sources. Published data were used extensively. In addition, information obtained through personal interviews and from private files of individuals was an important element in the study.

AN ECONOMIC REVIEW OF THE U. S. STEEL INDUSTRY

Steel and the American Economy

Steel is a versatile material which is essential to the growth of the American economy. Over 95% of our civilization's metal requirements are met by steel.[1/] It is from steel that our production tools are made. Steel is a basic material in consumer durables, transportation equipment, housing, and the means by which consumer services are provided. Significant growth of a society is impossible in our modern era without the abundant production of steel and its fabrication into thousands of kinds of useful products. Steel indeed is an indicator of the prosperity and industrialization of a society.

The economic prosperity of the United States today can be illustrated by comparing the growth in steel production with population increase. Between 1900 and 1967, the population in the United States increased 160% while the production of steel ingot increased over 1,000%. The more rapid growth of the steel industry is an important indicator of the increasing prosperity of the American society. Figure 1 shows the relative growth of the U. S. population and steel ingot production. Detailed statistics are given in Appendix 1.[2/]

Since steel is so broadly based in our economy, its relationships with gross national product and industrial production are close. Figure 2 represents the indexes of steel ingot production, industrial production, and gross national product in the United States from 1947 to 1966. These three trends are generally consistent with each other, although steel ingot production has of course grown less rapidly than the other two items. Steel ingot production also has exhibited a greater degree of fluctuation than either industrial production or gross national product. This is quite natural because the other two indexes consist of many product and service industry segments, and

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1/ American Iron and Steel Institute, The Competitive Challenge to Steel, New York, N. Y., 1963, p. 30.

2/ Throughout this report, data on U. S. steel production and shipments are those published by the American Iron and Steel Institute. These data include only tonnage reported by A.I.S.I. members. The percentages of total U. S. production and shipments which these figures represent vary from year to year, but constitute the vast bulk of the total. In the case of shipments, for example, reported tonnage was an estimated 80% of the total in 1967.

FIGURE 1
STEEL INGOT PRODUCTION VS, POPULATION IN THE UNITED STATES, 1900 – 1967

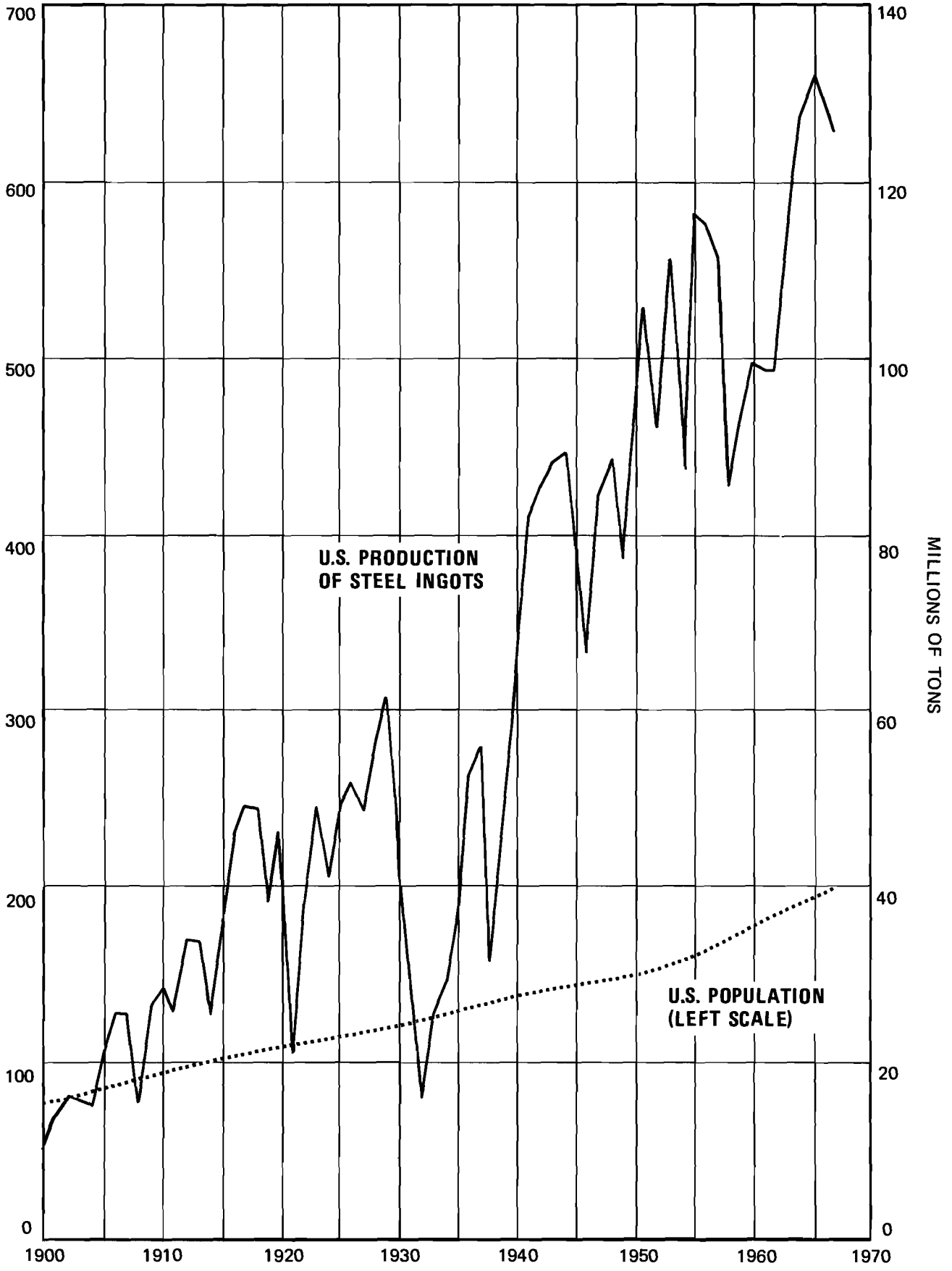
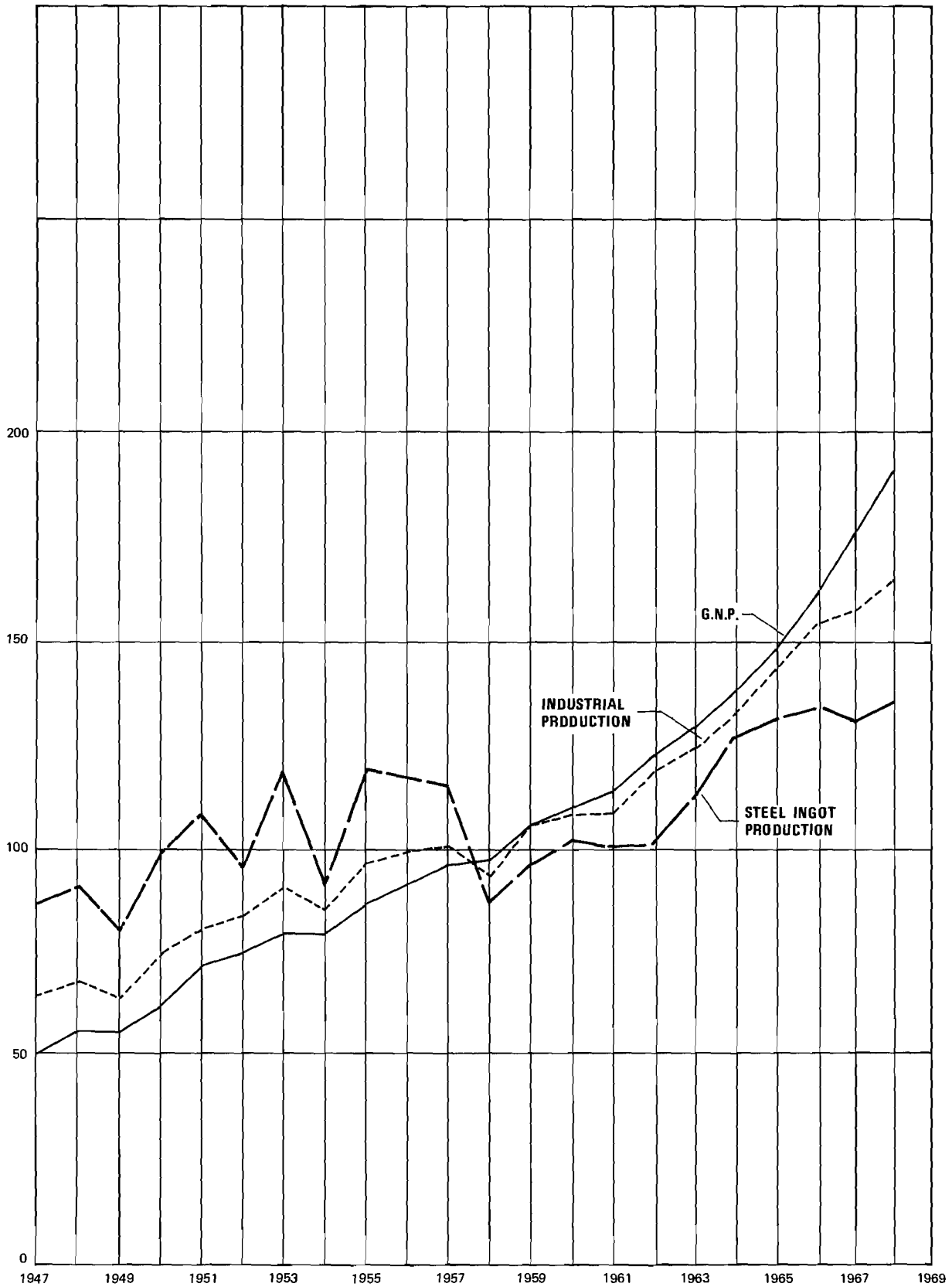


FIGURE 2
INDEXES OF STEEL INGOT PRODUCTION, INDUSTRIAL PRODUCTION, AND GROSS NATIONAL PRODUCT IN THE UNITED STATES, 1947 – 1968
(1957 – 59 = 100)



fluctuations in one segment are generally smoothed out by counterfluctuations in other segments. These three indexes are given in Table 1.

Table 1

INDEXES OF STEEL INGOT PRODUCTION, INDUSTRIAL PRODUCTION, AND GROSS NATIONAL PRODUCT IN THE UNITED STATES, 1947-1968 (1957-59 = 100)

Year	Steel Ingot Production[a/]	Industrial Production[b/]	Gross National Product[b/]
1947	87.4	65.7	50.6
1948	91.2	68.4	56.3
1949	80.3	64.7	56.1
1950	99.5	74.9	62.2
1951	108.3	81.3	71.8
1952	95.9	84.3	75.5
1953	119.4	91.3	79.7
1954	90.9	85.8	79.8
1955	120.4	96.6	87.0
1956	118.6	99.9	91.7
1957	116.0	100.7	96.4
1958	87.8	93.7	97.8
1959	96.1	105.6	105.7
1960	102.2	108.7	110.1
1961	100.9	109.7	113.7
1962	101.2	118.3	122.5
1963	112.5	124.3	129.1
1964	127.1	132.3	138.1
1965	131.5	143.3	148.9
1966	134.1	156.0	161.7
1967	131.0	158.1	172.9
1968	135.3	164.7	188.4

Sources: a/ American Iron and Steel Institute, Annual Statistical Report, New York, N. Y.

b/ U. S. Department of Commerce: Bureau of the Census, Long Term Economic Growth, 1966, and Office of Business Economics, Survey of Current Business.

Shipments, Exports, Imports, and Consumption

The output of the U. S. steel industry fluctuates widely from year to year but shows a moderate growth rate over the long term. In contrast, the quantity of steel imported for sale in U. S. markets has grown both persistently and rapidly. Detailed data on steel production, shipments, exports, imports, and consumption from 1954 to 1968 are given in Table 2.

The measure of production shown in Table 2 is steel ingot, a basic raw steel product which may be rolled, forged, or remelted for casting into intermediate or finished steel products. The steel product shipments data shown in Table 2 include a very small amount of ingot and intermediate steel products (such as billets, slabs, and sheet bars) but comprises primarily finished steel products such as structural shapes, plates, rails, bars, tool steel, pipe, tubing, wire, sheets, strip, and tin plate.

Annual ingot production in the United States is generally considerably larger than shipments of steel products. In the process of converting ingot to finished products, as much as one-third of the ingot is lost as waste which must be recycled. A small part of the difference between ingot production and steel product shipments may be due to inventory buildup in certain years. Both ingot production and steel product shipments fluctuated during the period shown but trended toward moderate growth.

Net shipments of steel mill products in tonnage and in percentage from 1958 to 1967 are given in Appendix 2. Growth items include cold rolled sheets and galvanized sheets and strips. Declining items include railroad products, oil pipe and tubing, and raw steels such as ingots and steel castings. Shipments of carbon steel have increased in volume but declined in percentage. Stainless and alloy steels have increased in both volume and percentage. The growth of alloy steel shipments has been impressive.

Steel product consumption in the U. S. (a function of shipments minus exports plus imports) increased faster than production or shipments in the period shown in Table 2. This is due to the fact that imports increased rapidly while exports decreased during the period. Imports totaled 771,000 tons in 1954 and rose to 17,960,000 tons in 1968, an increase of 2,200% in 14 years; exports totaled 2,792,000 tons in 1954 and fell to 2,170,000 tons in 1968, a decline of nearly 30% in the same period. On the whole, ingot production,

steel products shipments, and consumption fell into the same pattern, with consumption rising faster than shipments and with exports and imports trending in opposite directions. (See Figures 3 and 4.)

Table 2

PRODUCTION, SHIPMENTS, IMPORTS, EXPORTS, AND CONSUMPTION OF STEEL MILL PRODUCTS IN THE UNITED STATES, 1954-1968
(in thousands of net tons)

Year	Steel Ingot Production	Steel Products			
		Shipments	Exports	Imports	Consumption
1954	88,312	63,153	2,792	771	61,132
1955	117,036	84,717	4,061	973	81,629
1956	115,216	83,251	4,348	1,341	80,244
1957	112,715	79,895	5,348	1,155	75,702
1958	85,255	59,914	2,823	1,707	58,798
1959	93,446	69,377	1,677	4,396	72,096
1960	99,282	71,149	2,977	3,359	71,531
1961	98,014	66,126	1,990	3,163	67,299
1962	98,328	70,552	2,013	4,100	72,639
1963	109,261	75,555	2,224	5,446	78,777
1964	127,076	84,945	3,442	6,440	87,943
1965	131,462	92,666	2,496	10,383	100,553
1966	134,101	89,995	1,724	10,753	99,023
1967	127,213	83,897	1,685	11,454	93,666
1968	131,462	91,856	2,170	17,960	107,646

Source: American Iron and Steel Institute, Annual Statistical Report.

The relationships between the four trade activities are shown in Table 3. Shipments exceeded consumption in 1954 when the U. S. was a net exporter of steel products; imports accounted for only 1.26% of U. S. consumption. By 1968, use of imported steel had soared to 16.68% of U. S. consumption, and the shipments of U. S. producers were equivalent to about 85% of consumption.

Analysis of the import situation in terms of region, country of origin, and products reveals that in 1967 the Canadian border and inland region imported 33.79% of the total volume, the Atlantic Coast 27.30%, the Gulf Coast

FIGURE 3
STEEL INGOT PRODUCTION AND SHIPMENTS AND CONSUMPTION OF STEEL MILL PRODUCTS IN THE UNITED STATES, 1954 – 1968

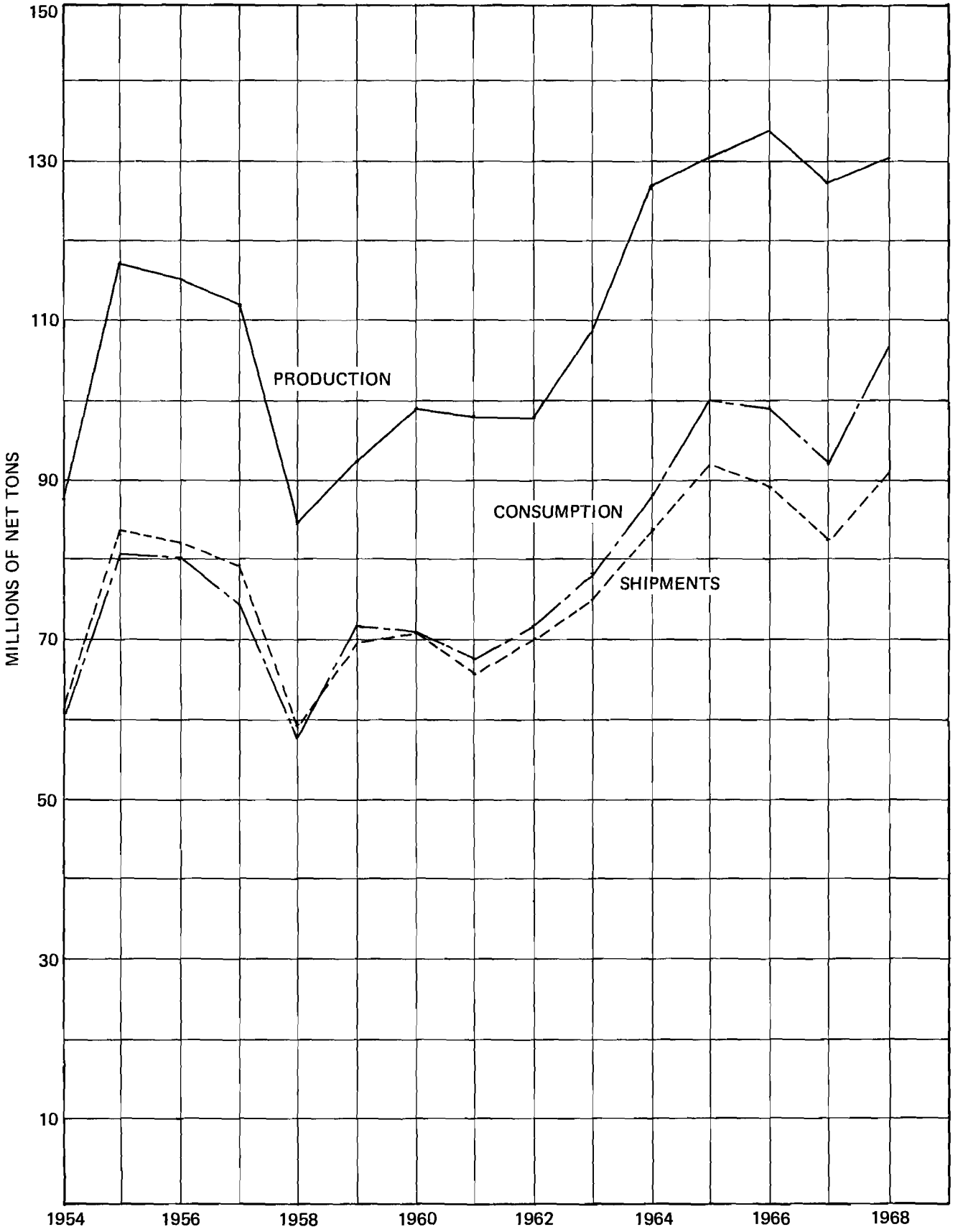


FIGURE 4
IMPORTS AND EXPORTS OF STEEL MILL PRODUCTS
IN THE UNITED STATES, 1954 – 1968

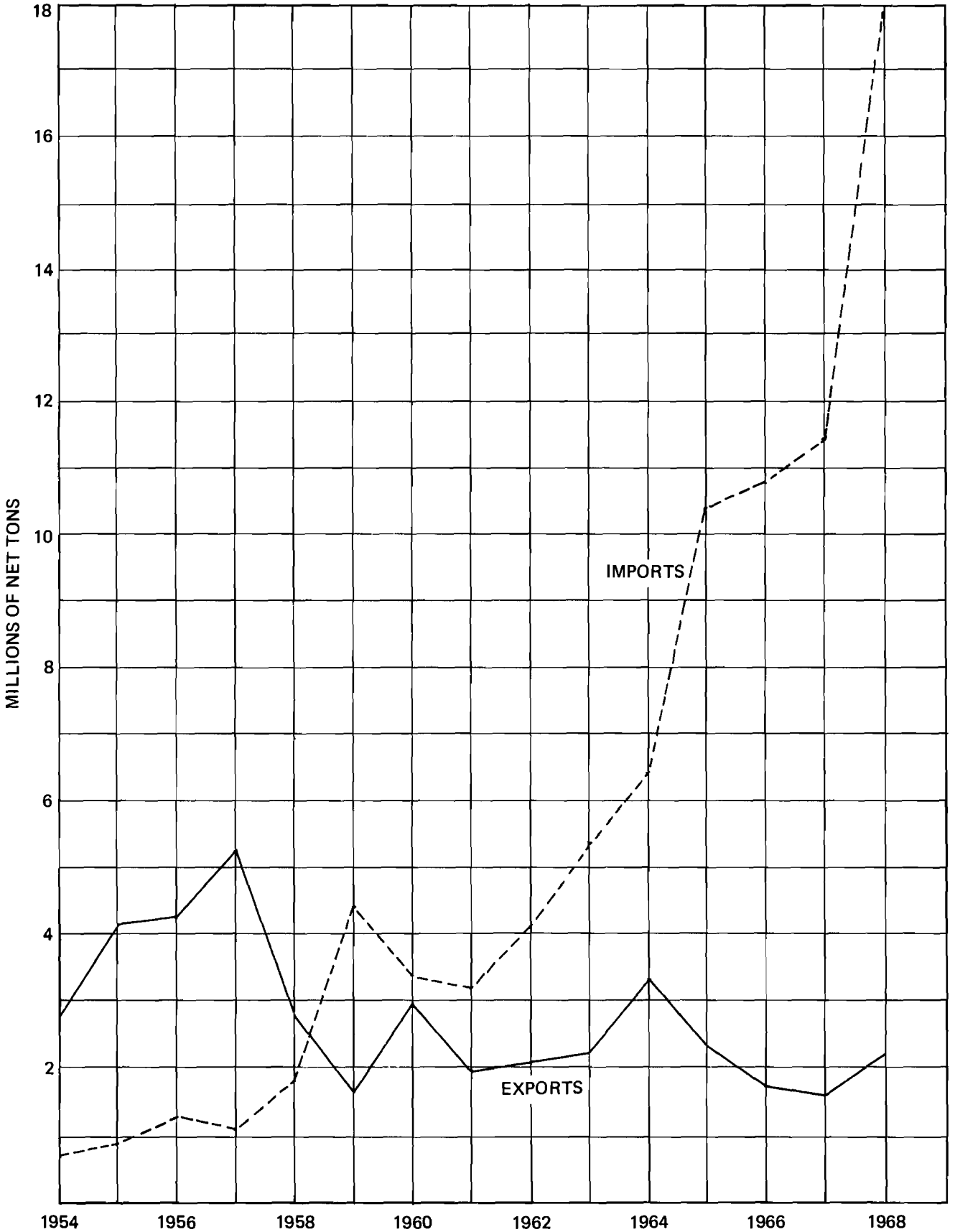


Table 3

SHIPMENTS, EXPORTS, AND IMPORTS AS A PERCENTAGE OF CONSUMPTION OF STEEL MILL PRODUCTS IN THE UNITED STATES, 1954-1968

Year	Shipments	Exports	Imports	Consumption[a/]
1954	103.31	4.57	1.26	100
1955	103.78	4.97	1.19	100
1956	103.75	5.42	1.67	100
1957	105.53	7.06	1.53	100
1958	101.90	4.80	2.90	100
1959	96.23	2.33	6.10	100
1960	99.47	4.16	4.69	100
1961	98.26	2.96	4.70	100
1962	97.13	2.77	5.64	100
1963	95.91	2.82	6.91	100
1964	96.59	3.91	7.32	100
1965	92.16	2.48	10.32	100
1966	90.88	1.74	10.86	100
1967	89.57	1.80	12.23	100
1968	85.33	2.02	16.68	100

a/ Consumption equals shipments minus exports plus imports.

20.08%, the Pacific Coast 16.13%, and off-shore islands 2.70%. More than two-thirds of all U. S. imports originate in three countries -- Japan, accounting for 39.2% of total imports in 1967; West Germany, with 16.7%; and Belgium-Luxembourg, with 15%. Major products imported during 1967 include hot rolled sheets, 2,264,744 tons; cold rolled sheets, 1,424,518 tons; various bar products, 1,156,311 tons; wire rods, 1,076,467 tons; structural shapes, 1,033,672 tons; and plates, 1,025,349 tons. These major items constituted about 60% of all imported steel products in 1967.

The United States had been a net exporter of steel products prior to 1959. The change in the export-import position has caused some discussion and criticism in the business world, as well as in the academic community. Critics say that the steel industry has been too conservative in adopting new technology and slow in research and development work. They point out that the industry bought 40 million tons of the wrong kind of capacity -- the open

hearth furnace -- in the 1950's, while foreign steel companies invested in the basic oxygen furnace (BOF). However, the industry has been spending over $2 billion annually for BOF's and other new facilities, along with additional funds for research and development in recent years. According to the National Science Foundation, research and development expenditures by the primary iron and steel industry totaled $144 million in 1967. Although these expenditures have been growing, rising from $64 million a decade earlier, they are still relatively low compared with research-oriented industries, such as aerospace, chemicals, and electronics.

The import problem has been influenced by many factors, such as rapidly expanding steelmaking capacity abroad since the end of World War II, cheap foreign labor, pressures on foreign producers to export, and domestic labor strikes, as well as superior productivity on the part of foreign steel plants. As a result, foreign steel products are sold $15 to $30 per ton cheaper than the equivalent domestic products, depending upon place and kind of steel products.

To counter the intensified import trend, the steel industry has adopted several measures. The recent huge investments in new production facilities are a start toward long-term increases in productivity. An immediate approach is to appeal to the federal government for the adoption of an import quota or other means of import control to provide immediate relief. So far, the appeal has not been effective. However, a voluntary agreement with the Japanese and Western European steel producers has been reached recently that reduces imports to 14 million tons annually. If the agreement can be upheld, it will slow the tide of steel imports in the future. According to the latest reports, steel imports in 1969 may be below the voluntary quota of 14 million tons because of the domestic dock strike, the high demand for steel in foreign markets, and increased prices for imported steels. Whether the temporary slackening of imports will have a lasting effect or not depends to a large extent on the willingness of foreign steel producers to uphold the voluntary agreement and the worldwide demand for foreign steel.

In the last year or two, major U. S. steel companies have begun a diversification program, the breadth of which is rare in the history of U. S. steel companies. The diversification program has carried several major steel companies into the manufacture of plastics, aluminum, chemicals, plywood, lumber,

transportation and industrial equipment, etc. On the other hand, old steel plants slated for modernization have been shut down or their remodeling postponed. These moves may remake the steel industry into a smaller, but more efficient industry. The ultimate purpose is to improve returns from all operation

Steel Forecast to 1980

Forecasting is a hazardous business. It involves many variables which cannot be predicted with accuracy. In forecasting the trends in the domestic steel industry, imports loom large as an unknown quantity. The future level of imports depends to a large extent, as pointed out previously, on the validity of the voluntary agreement on imports reached with foreign steel producers. Domestic dock strikes, steel labor strikes, and the attitude of Congress toward the import situation are all important factors which will affect the levels of steel imports and domestic production. These factors cannot be foreseen to a decade ahead.

However, a forecast was made for this study based on the assumption that steel imports would hold fairly steady at 15 million tons in 1975 and 16 million tons in 1980 in an extension of the current voluntary agreement with foreign steel producers. Exports would be somewhat higher than the current level of 2 million tons a year. The domestic consumption of steel mill products was projected at 116 million tons in 1975 and 128 millions tons in 1980, which is a growth rate of approximately 2% a year. Working backward, ingot production was estimated at 150 million tons in 1975 and 166 million tons in 1980. Shipments were estimated at 105 million tons in 1975 and 116 million tons in 1980. All of these projections were based on normal growth of the national economy and no major mishaps in foreign affairs. Details are given in Table 4.

Table 4

FORECAST ONE: PROJECTED STEEL INGOT PRODUCTION AND SHIPMENTS, EXPORTS, IMPORTS AND CONSUMPTION OF STEEL PRODUCTS IN THE UNITED STATES, 1975 AND 1980
(in millions of net tons)

Year	Steel Ingot Production	Steel Products			
		Shipments	Exports	Imports	Consumption[a/]
1975	150	105	4	15	116
1980	166	116	4	16	128

a/ Consumption equals shipments minus exports plus imports.

If the voluntary agreement on imports is not maintained by foreign steel producers and the pattern of imports continues its former rising trend, imports may reach 22 million tons by 1975 and 28 million tons by 1980. Consequently, projections on production, shipments, and exports would have to be made on lower levels. (See Table 5.) However, Congress might take such action as imposing import quotas if the import situation worsened appreciably.

Table 5

FORECAST TWO: PROJECTED STEEL INGOT PRODUCTION AND SHIPMENTS, EXPORTS, IMPORTS, AND CONSUMPTION OF STEEL PRODUCTS IN THE UNITED STATES, 1975 AND 1980
(in millions of net tons)

Year	Steel Ingot Production	Steel Products			
		Shipments	Exports	Imports	Consumption
1975	138	97	3	22	116
1980	147	103	3	28	128

Several forecasts of steel production, shipments, exports, and imports, made by different sources, are shown in Appendix 3. The results of these forecasts differ to a great extent. A recent projection made by Lionel D. Edie and Company, a prominent consulting firm in New York City, estimates steel production at 162 million tons by 1975 and at 180 million tons by 1980. Shipments were projected at 115 million tons by 1975 and at 135 million tons by 1980.

Major Market Outlets

The American Iron and Steel Institute has kept a fairly extensive record of its members' steel shipments by market classifications. Table 6 lists shipments by 21 market classifications in selected years from 1950 to 1968. The classification system is based both on the shipments of producers and on end uses. The table also shows the percentage of total shipments each market outlet represents, as well as the percent change between 1950 and 1968. Economic activities in both 1950 and 1968 were basically normal without extreme upheavals except for the effect of the Vietnam war upon ordnance and other military uses of steel in the latter year.

The automotive industry is the largest market outlet for steel, representing about 21% of all steel used in 1968. Between 1950 and 1968, the volume of steel used in this industry increased 33%. Several forecasts all point to big

Table 6

DOMESTIC STEEL DISTRIBUTION BY MARKET CLASSIFICATIONS, 1950-1968
(Shipments of all grades from U. S. mills, in thousands of net tons)

	1968		1967		1965		1960		1955		1950		1950-1968
	Shipments	%	Shipments	%	Shipments	%	Shipments	%	Shipments	%	Shipments	%	% Change
Automotive	19,269	21.0	16,488	19.7	20,123	21.7	14,610	20.5	18,722	22.1	14,472	20.0	33
Steel Service Centers	16,099	17.5	14,863	17.7	16,369	17.7	12,480	17.5	15,759	18.6	13,360	18.5	20
Construction (including maintenance)	12,195	13.3	11,375	13.6	11,836	12.8	9,664	13.6	9,681	11.4	8,602	11.9	42
Containers, Packaging, & Shiping Materials	7,902	8.6	7,255	8.6	7,331	7.9	6,429	9.0	6,723	7.9	5,911	8.2	34
General Purpose Industrial Equipment	5,469	6.0	4,994	6.0	5,873	6.3	3,958	5.6	4,699	5.6	3,474	4.8	57
Contractors' Products	4,922	5.4	4,582	5.5	5,018	5.4	3,602	5.1	3,982	4.7	3,075	4.3	60
Rail Transportation	3,048	3.3	3,225	3.8	3,805	4.1	2,525	3.5	3,521	4.2	4,299	6.0	- 41
Unclassified	2,958	3,2	2,839	3.4	2,785	3.0	2,120	3.0	919	1.1	1,330	1.8	122
Converters & Processors	2,909	3.2	2,837	3.4	3,932	4.2	2,928	4.1	3,753	4.4	3,900	5.4	- 34
Power Generating & Distributing Equipment	2,897	3.1	2,808	3.3	2,985	3.2	2,078	2.9	2,292	2.7	1,837	2.5	58
Appliances, Utensils, & Cutlery	2,292	2.5	2,092	2.5	2,179	2.4	1,760	2.5	2,199	2.6	2,088	2.9	10
Export	2,147	2.3	1,407	1.7	2,078	2.3	2,563	3.6	3,583	4.3	2,567	3.5	- 16
Domestic & Commercial Equipment	2,070	2.3	2,060	2.5	2,179	2.4	1,959	2.8	2,189	2.6	1,804	2.5	15
Ordnance & Other Military	2,025	2.2	1,622	1.9	289	0.3	165	0.2	857	1.0	195	0.3	938
Agricultural	1,400	1.5	1,409	1.7	1,483	1.6	1,003	1.4	1,337	1.6	1,538	2.1	- 9
Forgings[a/]	1,197	1.3	1,208	1.4	1,250	1.4	841	1.2	1,266	1.5	1,082	1.5	11
Bolts, Nuts, Rivets, & Screws	1,116	1.2	1,128	1.3	1,234	1.3	1,072	1.5	1,475	1.7	1,410	1.9	- 26
Shipbuilding & Marine Equipment	1,006	1.1	943	1.1	1,051	1.1	622	0.9	601	0.7	327	0.5	208
Mining, Quarrying, & Lumbering	457	0.5	345	0.4	392	0.4	288	0.4	269	0.3	289	0.4	58
Oil & Gas Drilling	387	0.4	315	0.4	380	0.4	404	0.6	793	0.9	620	0.9	- 38
Aircraft	90	0.1	102	0.1	94	0.1	78	0.1	97	0.1	52	0.1	73
TOTALS	91,855	100.0	83,897	100.0	92,666	100.0	71,149	100.0	84,717	100.0	72,232	100.0	

a/ Except automotive, aircraft, agricultural, general purpose industrial equipment, and power generating and distributing equipment.

Source: American Iron and Steel Institute.

increases in the future because of the rise in population and personal income, the trend to two- and three-car families, the continued movement to suburbia, the high scrappage rate, the increasing amount of construction, and the rising level of farm produce hauling.

Steel service centers represent about 17.5% of the volume of steel shipped by domestic steel producers in 1968. Although shipments to steel service centers increased 20% between 1950 and 1958, the proportion of all shipments dropped from 18.5% to 17.5%. Steel service centers and distributors purchase steel products from producers and resell them to various end users. According to a trade source, steel companies tend to ship directly to end users and by-pass service centers and distributors. This may have implications in the Southeast, which is a steel-deficit area depending to a large extent on the supplies from these service centers and distributors.

Construction represents 13.3% of the steel shipped in 1968, while contractors' products constituted 5.4% in the same year. Both outlets are high growth items. Between 1950 and 1968, steel shipped for construction purposes increased 42% while that shipped for contractors' products increased 60%. The construction industry is projected to provide the largest increase in steel demand in the future. This is an area of importance to the Southeast, which is strong in construction activities but has a paucity of automotive plants.

Containers, packaging, and shipping materials represent about 8.6% of the steel shipped in 1968. Between 1950 and 1968, these uses of steel increased 34%. The rapid growth of land-sea cargo containers in recent years has had an important bearing on this increased demand. Since the Southeast has over a dozen major seaports, the growth in steel demand for these outlets should be impressive.

General purpose industrial equipment and power generating and distributing equipment are high growth items. The combination of these two outlets represents 9.1% of all steel shipped in 1968. Between 1950 and 1968, the volume used by these industries increased 57% and 58%, respectively.

Together these seven market outlets account for nearly 75% of all domestic steel shipped, and the automotive group, steel service centers, and construction alone represent over one-half of total shipments. The remaining 14 market classifications are almost equally divided between those which have exhibited

an increase in tonnage requirements over the 18-year period and those which have declined.

The largest percentage increases were in ordnance and other military uses (938%) and in shipbuilding and marine equipment (208%). Of the six outlets showing a decline in shipments, the most significant are rail transportation (-41%), converters and processors (-34%), and oil and gas drilling (-38%).

Technology and Investments

In a worldwide setting, steelmaking technology has undergone revolutionary changes in the last two decades. The explosive growth of oxygen usage in steelmaking has greatly increased the efficiency and lowered the cost of steel production. Reduced electric power costs, improved electric furnace designs, and depressed scrap prices have resulted in expanded interest and accelerated growth in the production of electric-furnace steel, including low-carbon grades.

Many of these new developments have changed foreign steel companies into highly efficient operational units since the 1950's, resulting in severe competition for the American steel industry both abroad and at home. At the same time, the American steel industry has felt the pressure of competition from other materials, such as aluminum, concrete, and plastic, which have made significant inroads into the U. S. steel industry's traditional markets.

Competition both from technologically advanced foreign steelmakers and from other materials is largely responsible for the dynamic changes in U. S. steelmaking practices in the 1960's. In 1967, the industry invested close to $2.4 billion in new plants and equipment. This followed on the heels of some $5.4 billion invested during the prior three years. To meet competition, as well as expanding market needs, the steel industry will have to spend around $2 billion a year for as far into the future as can be realistically predicted. The emphasis of capital spending is on modernization and the installation of new and improved processes to upgrade the quality, strength, and versatility of steel and to cut down production costs. Recent capital expenditures by the U. S. steelmaking industries have been concentrated in six major areas.

First, programs have been adopted to improve raw materials. Giant new plants have been built to upgrade, or beneficiate, low-grade iron ore to high-quality sinter or pelletized feed for the blast furnace. Four new U. S. plants for converting taconite -- low-grade ore -- into high-quality pellets were

built in 1967, adding 11 million tons annually to ore supplies. This practice has assured long-range supplies of hot metal for steelmaking and hence lessened the industry's dependence on purchased scrap iron or scrap steel.

A second major development has been the strong trend toward construction of basic oxygen furnaces, or BOF's. Sixty-seven such furnaces are either in production or planned to be in production by the end of 1968. BOF's accounted for 17% of total steel production in 1965, 25% in 1966, and 33% in 1967; they are projected to produce 61% of the total by 1975.[1/] The basic oxygen process is being adopted because of lower production and capital costs, a faster production rate, and high product quality.

A third trend has been toward computer-controlled rolling mills that produce steel of a quality unparalleled in the industry, at greater speeds and at greater reliability. Computers are also used in guiding the output of furnaces, expediting orders, and cutting the red tape of billing, warehousing, and deliveries.

A fourth area of increasing interest is vacuum melting and vacuum degassing. To improve product quality, steel is being refined by degassing or melting in vacuum chambers to remove trapped hydrogen, oxygen, and nitrogen. Improved fabricating characteristics plus mechanical and metallurgical properties are gained which broaden the use of steel and extend the life of steel products. Bearings, gears, aircraft, and missiles, which must have superior mechanical and physical properties, are major applications. Only in recent years has interest grown in applying this method to the degassing of large tonnages of carbon and low-alloy steels.

A fifth area is continuous casting, a method of converting molten steel directly into wrought semifinished forms, such as billets, blooms, and slabs, without going through the conventional steps of turning it into ingots, stripping, soaking, and rolling into intermediate steel products. It is reported that a combination of vacuum degassing and continuous casting offers attractive possibilities -- the highest quality of steel produced at the lowest cost. While this process is not yet a major element in the steel industry, it holds exciting possibilities for the future. According to an estimate

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1/ Battelle Memorial Institute, Impact of Steel Making Trends on Suppliers, Columbus, Ohio, October 1964.

made by the Battelle Memorial Institute, the potential markets for continuous casting would call for installation of 154 machines valued at $831 million by 1975.

The sixth major development has been the electric furnace, which makes feasible the production of small volumes of steel with much lower capital outlay. The electric furnace, powered by easily available electricity and utilizing scrap as raw material, has freed steelmakers from dependence upon coal and iron ore, permitting much greater flexibility in choice of plant location. Recent improvements in design of these furnaces have further enhanced their attractiveness. As power costs and scrap prices decline, the arc furnace will play an increasingly important role in steel production. The swing to electric furnaces has been quite rapid. Electric furnaces accounted for 5% of the U. S. steel output in 1946, 7% in 1952, and 12% in 1967, with 15% projected by 1975.[1/] A more recent analysis, made in accordance with the latest data, calculates that about 14% of all primary steel produced in the spring of 1969 was made in electric furnaces and projects the 1975 share at 23%.[2/] The future of the electric furnace is so promising that one prediction stated that within 25 years U. S. steelmaking capacity will be divided almost equally between electric furnaces (45%) and BOF's (55%), with the open hearth in limbo.[3/]

Pricing Structure and Regional Development

The pricing systems historically followed by the U. S. steel industry, in which prices were quoted on a delivered basis, have hampered dispersion and expansion of the industry by giving the traditional steel-producing areas an artificial economic advantage in selling to the national market. Beginning with a single basing-point system in the last quarter of the 19th century, pricing structure was changed to a multiple basing-point system in 1924, became more competitive with the introduction of f.o.b.-mill pricing in 1948, and was finally modified to the freight equalization system in use today.

Under the single basing-point system, which resulted from the oligopolistic dominance of steel producers in the Pittsburgh area, steel was sold at the

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1/ Battelle Memorial Institute, op. cit., p. I-11.

2/ Projection made by Lionel D. Edie and Company.

3/ Association of Iron and Steel Engineers, Developments in the Iron and Steel Industry During 1967, Pittsburgh, Pa., 1968, p. D-39.

Pittsburgh base price, plus the cost of rail transportation from Pittsburgh to the destination, regardless of the location of the steel plant making the sale. The system was constantly under attack, particularly by steel users located near mills in other sections of the country who were forced to pay substantial amounts of phantom freight whenever they purchased supplies from local mills. Finally, in 1924, the Federal Trade Commission ordered "Pittsburgh-plus" to be abandoned, and a multiple basing-point system was substituted.

With the advent of the multiple basing-point system, the leading steel companies designated additional bases at Birmingham, Chicago, Duluth, Cleveland, and a number of other cities. At first the lowered freight charges were partially offset by higher mill prices at bases other than Pittsburgh, but the practice was changed in 1938 to quotation of a standard base price for each product regardless of the mill where it was produced. Additional basing-points were established from time to time as new companies and new production centers gained in importance.

Under the multiple basing-point system, each basing-point set the delivered price within the area in which its base price plus the standard rail freight charge was lower than that of any other basing-point. This meant that sellers from more distant places had to absorb part of their freight costs and that non-base mills which were closer to the customer than the basing-point had to include some phantom freight in their charges.

Although multiple basing-point pricing was much less discriminatory than "Pittsburgh-plus," it also fell under heavy attack as being monopolistic. In 1948, soon after the U. S. Supreme Court ruled that the similar basing-point system of the cement industry was unlawful and with conspiracy proceedings against all major steel producers pending before the Federal Trade Commission, the United States Steel Corporation announced that it was switching to f.o.b.-mill pricing. Other steel companies followed suit almost immediately. The change to the f.o.b.-mill policy meant that each steel plant was free to establish its own price and that the buyer would be charged the price at the mill from which the purchase was made plus the actual transportation cost (whether by rail, truck, or barge) to the point of delivery.

In actual practice today, the steel industry appears to follow a freight equalization policy which incorporates features of both f.o.b.-mill and basing-point pricing. Under this system, a producer establishes a price at his mill

and quotes the mill price plus freight cost to the point of delivery, as in f.o.b. pricing. However, if he sells to customers in a territory where another mill has a lower delivered price, he absorbs or equalizes freight sufficiently to meet the lower price. This is the general situation, but in actual practice, some mills may absorb freight on certain products but not on others. For example, a major mill in the Chicago area gives no freight equalization on plates and structurals to southern users but does absorb freight equalization costs on sheets, strips, and bars shipped to southern regions.

Although each steel plant is free to set its own prices, a uniform price list for major steel products is still in general use by the industry, as was the case under the basing-point systems. The published prices are basic prices subject to additional charges when special features or requirements are specified by buyers. Since base prices generally are noncompetitive, delivery costs and reliability of supply are the important considerations in making purchasing decisions.

The freight equalization scheme is similar to the multiple basing-point method except that every mill is a basing-point. Each plant has a freight advantage area, and no plant is the victim of artificial barriers to developing its natural market area to the fullest. Larger plants tend to have larger marketing areas because their lower per-unit production costs enable them to economically absorb greater freight differentials. The consumer also benefits from the elimination of phantom freight charges. However, since hundreds of steel products are produced by more than 200 companies in over 300 locations in the nation, marketing under the freight equalization pricing system is a complex problem.

What effects have the various pricing systems had upon the regional development of the steel industry? Obviously, the single-point basing system was designed to keep the Pittsburgh area the supplier for the nation, and since the nearer to Pittsburgh the lower the delivered price, the policy also tended to concentrate steel users in the same general area. Nevertheless, other steel centers did develop, despite the handicap, as a result of raw material advantages and the demands of rapidly rising industrialization of their respective regions, although they did not expand as rapidly as they could have under more competitive pricing conditions.

Even under the multiple basing-point system, the older, more established mills still had the economic edge and mills which had not achieved basing-point status had imposed upon them extremely restricted marketing areas. The fact that the inflexibility of delivered steel prices made it a matter of indifference to a steel buyer whether he bought from a supplier located within or without his region also tended to hamper regional development of the steel industry.

Economists agree that the basing-point pricing system, in both its forms, hindered the industrial growth of the West and South. It is one of the prime reasons why Birmingham, for example, despite its proven ability to produce iron and steel at one of the lowest production costs in the nation, has never come anywhere near to satisfying the demand within its natural market area; until 1938, delivered prices from Birmingham mills invariably were arbitrarily set higher than those from Pittsburgh, and since then, price uniformity practices have dictated base prices no lower than Pittsburgh's.

Also discouraging industrial development in steel-deficit regions was the instability of the steel supply situation fostered by the multiple basing-point system. When conditions were poor, steel mills made vigorous efforts to secure customers in distant markets, and northern and eastern mills built up sales in many sections of the South where they had to absorb freight. The strong demand in their natural market areas during World War II and the post-war years enabled these mills to cut off their shipments to distant markets. Consequently, southern users suddenly found themselves without suppliers and without much prospect of arranging for sufficient supplies from southern mills.

Steel users in the South historically have had to pay higher prices in order to obtain supplies. Even under the competitive conditions existing today, a southern steel user cannot always get the advantage of freight equalized pricing on orders placed with northern mills. As a result, some users in the coastal area have switched to foreign supplies.

The unbalanced development of the steel industry in the nation is aptly summarized by the following quote from Stocking[1/]:

> The South's war and postwar industrialization has called for far more steel than the old agricultural South required. Wright estimated

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1/ George W. Stocking, Basing Point Pricing and Regional Development, The University of North Carolina Press, Chapel Hill, N. C., 1954, p. 151.

that the South now consumes three times as much steel as it produces.* With its rich market and inadequate capacity, clearly the South's interests both as a producer and consumer of steel run counter to restrictive production and pricing policies. Institutionalized arrangements -- the structure and control of the steel industry and its business practices -- rather than technical or economic forces have been primarily responsible for keeping the South a deficit producing area. Greater decentralization in ownership and control of steel production, more particularly an arrangement whereby the rate of expansion in the South's steel industry is not subordinated to the interest of northern plants under the same control, would clearly promote the South's industrial progress.

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* E. C. Wright, "The Economics of Raw Material Supplies in the Birmingham District," Mining Engineering, December 1950, p. 1214.

Although the freight equalization system under which the steel industry has been operating for the past few years has freed the smaller, newer steel installations to build up their natural market areas and perhaps has had some influence upon the increasing market orientation of the industry in plant location decisions, the established steel firms still have no great incentive to disperse their facilities into steel-deficit regions such as the South. With the steel user bearing the freight costs, it is easier for the steel companies to expand and modernize capacity at existing northern mills to meet increased demand rather than to build new facilities in the South. Establishment by independent or foreign concerns of southern mills to manufacture specific products now lacking in the South, however, might provide the necessary catalyst.

In a well-developed industrial economy, there should be a place for a number of small steel plants, operating on scrap or purchased ingots, and there should be an opportunity for such plants to develop into larger operations if the growth of the market permits. Current construction of at least one steel mill in South Carolina and the moderate expansion of the Atlantic Steel Company in Georgia may signal the beginning of a new steel era in the Southeast.

Regional Trends in Steel Production

Statistics on steel ingot production and share of steel ingot output in 11 steel producing centers from 1947 to 1965 are summarized in Table 7 and Table 8. These centers are represented either by major cities, such as Chicago, Pittsburgh, Youngstown, Detroit, Buffalo, Cleveland, Cincinnati, and St. Louis, or

Table 7

STEEL INGOT PRODUCTION, 1947-1965, U. S. AND MAJOR STEEL PRODUCING CENTERS
(in millions of tons)

	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	Average Annual Rates of Growth
United States	84.89	88.64	77.98	96.84	105.20	93.17	111.61	88.31	117.04	115.22	112.72	85.26	93.45	99.28	98.01	98.33	109.26	127.08	131.19	1.5%
Chicago	17.16	17.75	15.60	19.12	20.48	17.55	22.04	18.92	23.60	22.63	22.24	18.34	17.94	20.68	20.68	21.07	23.02	25.94	26.39	1.8
Pittsburgh	22.30	22.94	19.78	24.20	26.30	23.36	26.72	19.99	26.30	25.67	24.83	18.31	19.99	19.99	19.15	19.57	21.67	25.25	25.97	-0.3
Northeast Coast	10.31	11.01	9.75	12.12	13.38	11.56	14.35	11.70	16.17	16.44	16.30	12.40	13.10	14.35	14.07	13.65	14.77	17.69	18.20	2.4
Youngstown	11.17	11.52	9.40	12.05	13.29	11.43	12.85	8.69	12.67	12.32	10.46	7.09	9.04	8.33	7.80	7.98	8.93	10.90	11.35	-1.5
Detroit	3.12	3.45	3.34	4.65	4.81	4.60	5.14	4.10	6.02	6.24	6.24	4.54	5.63	6.51	6.67	7.11	8.42	9.41	9.66	5.6
Western	4.33	4.69	4.27	5.43	6.16	5.73	6.64	5.36	6.46	6.64	7.01	5.73	5.55	6.16	6.77	6.10	7.01	7.80	8.41	2.6
Southern	4.01	4.35	3.96	4.92	5.03	4.58	5.88	5.20	6.22	5.43	6.67	5.09	5.20	5.65	5.71	5.71	6.22	7.23	7.70	2.7
Buffalo	4.21	4.37	4.06	4.87	5.38	4.82	6.04	4.77	6.55	6.29	6.45	4.06	4.72	5.18	4.72	4.77	5.43	6.04	7.11	1.4
Cleveland	4.01	4.06	3.67	4.59	4.92	4.49	5.99	4.68	6.08	5.75	5.79	3.86	4.83	5.55	5.12	5.36	5.84	7.19	6.73	2.4
Cincinnati	2.71	2.75	2.52	3.11	3.50	3.07	3.58	3.11	4.29	4.80	4.01	3.30	4.48	3.97	4.36	4.17	4.80	5.54	6.24	4.0
St. Louis	1.45	1.48	1.48	1.84	1.95	1.86	2.27	1.89	2.63	2.74	2.63	2.60	2.99	2.66	3.01	2.96	3.10	3.37	3.42	4.9

Source: Federal Reserve Bank of Cleveland, Economic Review, November 1966.

Table 8

SHARES OF TOTAL STEEL INGOT OUTPUT PRODUCED BY MAJOR STEEL CENTERS, 1947-1965

	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
United States	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Chicago	20.2	20.1	20.1	19.7	19.5	18.9	19.7	21.4	20.2	19.7	19.8	21.5	19.2	20.9	21.1	21.4	21.1	20.5	20.1
Pittsburgh	26.3	26.0	25.4	25.0	25.0	25.1	24.0	22.6	22.5	22.3	22.0	21.5	21.3	20.2	19.5	19.9	19.9	20.0	19.8
Northeast Coast	12.1	12.5	12.5	12.5	12.7	12.4	12.9	13.3	13.8	14.3	14.5	14.5	14.0	14.5	14.3	13.9	13.5	14.0	13.9
Youngstown	13.2	13.0	12.1	12.5	12.6	12.3	11.5	9.8	10.8	10.7	9.3	8.3	9.7	8.4	8.0	8.1	8.2	8.6	8.6
Detroit	3.7	3.9	4.3	4.8	4.6	4.9	4.6	4.6	5.1	5.4	5.5	5.3	6.0	6.6	6.8	7.2	7.7	7.4	7.4
Western	5.1	5.3	5.5	5.6	5.9	6.2	6.0	6.1	5.5	5.8	6.2	6.7	5.9	6.2	6.9	6.2	6.4	6.2	6.4
Southern	4.7	4.9	5.1	5.1	4.8	4.9	5.3	5.9	5.3	4.7	5.9	6.0	5.6	5.7	5.8	5.8	5.7	5.7	5.9
Buffalo	5.0	4.9	5.2	5.0	5.1	5.2	5.4	5.4	5.6	5.5	5.7	4.8	5.1	5.2	4.8	4.8	5.0	4.8	5.4
Cleveland	4.7	4.6	4.7	4.7	4.7	4.8	5.4	5.3	5.2	5.0	5.1	4.5	5.2	5.6	5.2	5.5	5.3	5.7	5.1
Cincinnati	3.2	3.1	3.2	3.2	3.3	3.3	3.2	3.5	3.7	4.2	3.6	3.9	4.8	4.0	4.5	4.2	4.4	4.4	4.8
St. Louis	1.7	1.7	1.9	1.9	1.8	2.0	2.0	2.1	2.2	2.4	2.4	3.1	3.2	2.7	3.1	3.0	2.8	2.7	2.6

Source: Federal Reserve Bank of Cleveland, Economic Review, November 1966.

by regions, such as Northeast Coast, Western, and Southern. It is clear that nearly all these centers registered a gain in their share of U. S. steel output during the past two decades, except the two old steel cities, Pittsburgh and Youngstown. More significantly, those centers which showed the greatest gains are outside the traditional steel producing areas. Detroit tripled its production, St. Louis and Cincinnati more than doubled, the Southern and Western regions nearly doubled, and Cleveland, Buffalo, and the Northeast Coast also expanded rapidly. Although the Chicago area emerged by 1960 as the leader in steel output, its rate of growth is not impressive. However, the steel plants built in the Chicago area in the last few years are not reflected in the production statistics in the table. The production growth in the Southern region occurred mainly in Texas, rather than in the Birmingham area.

The American Iron and Steel Institute has grouped steel production centers on a slightly different basis, distinguishing five steel producing districts: Eastern, Pittsburgh-Youngstown, Great Lakes, Southern, and Western. The Pittsburgh-Youngstown district produced about 50% of the nation's output in 1930 and dropped to 28% in 1965. The adoption of the multiple basing-point pricing system since 1924 has stimulated the growth of the Great Lakes district and has had an adverse effect on the Pittsburgh-Youngstown district. Currently, the Great Lakes district produces about 40% of the nation's total. The Chicago area alone produces and consumes over one-half of the district's output. About one dozen cold roll and hot roll mills have been added to the Chicago area since 1965. The area may change from a "steel deficit" to a "steel surplus" area soon if the demand does not keep up with the expansion of steel facilities in the area.

The Eastern district, which includes the Philadelphia area, has increased its steelmaking capacity since World War II. Its share of national steel production was about 20% in 1965. Bethlehem and U. S. Steel have major plants at Sparrows Point, Maryland, and Morrisville, Pennsylvania, respectively. The district produces a large volume of heavy construction steel, as well as steel plate for shipyards along the Atlantic Coast.

The Southern and Western districts still remain steel deficit areas. Each district produces about 6% of the nation's total steel output. Some expansion of steelmaking facilities has taken place in these two regions since World War II. Building of the Geneva plant in Utah in 1943 and expansion of the Kaiser

Steel Corporation in California have greatly increased the supply of steel in the Western district. The expansion of steelmaking facilities in the Southern district occurred mainly in Texas to take care of the oil industry along the Gulf Coast and in the southwestern states.

Birmingham remains the most important source of steel supply in the South, including the six-state study area. However, the Birmingham complex has not shown any growth in the last two decades, with the exception of some replacement of old facilities by new machinery. A number of electric furnaces have been added in the six-state area. Their capacities are small, and their output is limited to only light steel, such as bar and wire products to meet local construction needs. The area produces no specialty steel or stainless steel. Most of the heavy structural steels, large-size sheets, and plates have to be brought in from northern regions.

The geographical distribution of steel plants will change gradually but significantly in the future. Locational trends will be affected mainly by market growth, changes in raw material requirements, and advances in technology. The growing use of high-grade ore burdens in the blast furnaces should further reduce the attraction of coal, while the planned installation of nuclear power plants will make a great portion of the nation accessible to low-cost energy.

THE DEMAND FOR AND SUPPLY OF STEEL MILL PRODUCTS IN THE SOUTHEAST

The market for both domestic and imported steel mill products is growing rapidly in the six-state Southeast. In 1967, the area used 7.4 million tons o steel, some 6.3 million tons of which were produced in U. S. mills.

Employment in the area's large and growing steel fabricating complex more than doubled in the 1957-1967 decade. But the southeastern steelmaking industry has not kept pace with the burgeoning demand from this complex. Even if local producers operated at full capacity, they would fall far short of meetin the current new material needs of steel fabricators in the area.

Consequently, steel buyers in the area must bring in more than 4 million tons of finished steel mill products from distant northern mills or from abroa This exploitable market is expected to grow by 352,000 tons a year until 1975, and by even larger average annual increments in succeeding years.

Demand for Domestic Steel

The demand for domestic steel mill products in the six-state Southeast[1/] was an estimated 6,300,000 net tons in 1967. "Reported shipments" in the area[2/] totaled 5,363,000 net tons in 1967, a volume which, according to industry sources, accounted for approximately 85% of the total demand in that year. Since detailed data on trends, steel types, and end uses were available only on reported shipments, most of the tabulations in this section of the report are based upon the partial demand figure of 5,363,000 rather than the estimate total demand of 6,300,000 tons.

Demand Trends. As may be seen in Table 9, demand for domestic steel in the area rose from 3,463,000 net tons in 1960 to 5,363,000 net tons in 1967. This represented a 55% gain for the Southeast as opposed to an 18% increase for the nation. Although usage in the area slackened in 1967, as was true of the U. S. as a whole, the area's proportion of U. S. consumption increased without abatement through the years. Demand for the output of domestic steel mills grew from 4.8% of the U. S. total in 1960 to 6.39% in 1967.

1/ Alabama, Florida, Georgia, North Carolina, South Carolina, and Tenness

2/ That part of the area's demand supplied by reporting members of the American Iron and Steel Institute.

Table 9

PARTIAL DEMAND FOR DOMESTIC STEEL MILL PRODUCTS IN THE SIX SOUTHEASTERN STATES, 1960-1967

	Carbon		Alloy		Stainless		Total	
	1,000 Net Tons	% of U. S.	1,000 Net Tons	% of U. S.	1,000 Net Tons	% of U. S.	1,000 Net Tons	% of U. S.
1960	3,360	5.08	85	1.95	18	3.11	3,463	4.87
1961	3,889	5.51	70	1.70	19	3.31	3,478	5.26
1962	3,652	5.61	108	2.22	23	3.68	3,783	5.36
1963	3,869	5.57	162	3.00	27	4.15	4,058	5.37
1964	4,426	5.70	202	3.07	34	4.40	4,662	5.49
1965	4,962	5.90	262	3.42	44	4.98	5,268	5.68
1966	4,986	6.15	374	4.69	46	4.94	5,406	6.00
1967	4,867	6.40	450	6.41	46	5.49	5,363	6.39

Source: Based on unpublished reported shipments data supplied by an industry source. These shipments represent approximately 85% of total demand for domestic steel mill products in the area.

Table 9 further breaks down the demand in the Southeast by carbon, alloy, and stainless steel products. Shipments of carbon steel products to the area increased from 3,360,000 tons in 1960 to 4,867,000 in 1967 -- a 45% gain over the seven-year period compared with 15% in the nation as a whole. The area's share of U. S. consumption rose from 5.08% in 1960 to 6.40% in 1967.

The area registered a startling increase of 429% in demand for alloy steel between 1960 and 1967, in contrast to a 60% rise in the U. S. as a whole. Shipments to area users jumped from 85,000 tons, or 1.95% of the U. S., in the earlier year to 450,000, or 6.41% of the nation, in the later year.

Shipments of stainless steel to the six states grew from 18,000 tons in 1960 to 46,000 tons in 1967 -- a 155% increase in comparison with 47% in the U. S. The ratio of the area's consumption to the U. S. total increased from 3.11% to 5.49% in the same period.

Alabama leads the six states in demand for steel mill products, largely because of the secondary steel fabricating facilities that have grown up around the state's steel mills. The next largest user is Tennessee, followed by Georgia, North Carolina, Florida, and South Carolina. Each state's percentage of total shipments to the six-state area in 1967 is given in Table 10. Also included are the percentage increases in shipments of carbon, alloy, and stainless steels for each state between 1960 and 1967.

The table points out several notable characteristics of the steel market in the area. The volume of carbon steel shipped by domestic producers to Florida users rose very little over the seven-year period because of the heavy use of imported steels there. On the other hand, shipments of domestic alloy steel grew tremendously. Although South Carolina recorded huge increases for both alloy and stainless steels, the state still accounted for only 4.7% of all the steels shipped to the six-state area in 1967. The low starting bases in 1960 explains the high growth percentages of the state. Georgia had an above-average growth record except for stainless steel. However, the state started with the highest volume of stainless steel shipments of the six states in 1960.

Although Tennessee gained on Alabama percentagewise in carbon and stainless steel demand, the gap in actual tonnage between the two states has widened somewhat through the years. North Carolina's growth record has been comparable to Georgia's, but it is below Georgia in tonnage.

Table 10

SHARE OF STEEL SHIPMENTS TO THE SIX-STATE AREA IN 1967 AND PERCENTAGE INCREASE FOR CARBON, ALLOY, AND STAINLESS STEELS, 1960-1967, FOR EACH STATE

State	Share of Steel Shipments to Area, 1967	1960-67 Percentage Increase		
		Carbon	Alloy	Stainless
Alabama	30.9	38	285	185
Florida	11.2	4	2,630	107
Georgia	16.4	57	467	78
North Carolina	13.2	68	368	160
South Carolina	4.7	55	2,163	1,034
Tennessee	23.6	59	273	193
Six-State Area	100.0	45	429	155

Source: Based on unpublished reported shipments data supplied by an industry source. These shipments represent approximately 85% of total demand for domestic steel mill products in the area.

Current Demand -- End Uses and Product Kinds. Construction and contractors' products accounted for 43.5% of the area's demand for domestic steel mill products in 1967. Manufacturers of nonelectrical machinery used 12.5% of the total, producers of appliances consumed 8.2%, and the automotive industry used 7.1%. (See Table 11.) As will be shown in the final chapter of this report, "Steel Fabricating Opportunities for Georgia," all four of these fields have significant growth potentials in the area.

Estimated net tonnages consumed in 1967 and percentage distribution by major market outlets are shown in Table 11 for carbon, alloy, and stainless steels, as well as for all steels. Nearly half (45.9%) of the 4,867,000 tons of carbon steel shipped to the area went for construction and contractors' products, followed by 11% for nonelectrical machinery, 8.7% for appliances and domestic equipment, and 6.6% for uses in the automotive industry. Of 450,000 tons of alloy steel shipped, 27.7% was used in nonelectrical machinery, 20.7% in construction and contractors' products, 11.8% in automotive products, 9.1% in shipbuilding, and 8.9% in rail transportation equipment. Largest outlets for stainless steel were nonelectrical machinery, which accounted for 26.1% of the 46,000 tons consumed in the area; construction products and appliances, each using 17.4% of the total; and automotive products and containers, with 8.7% each.

Table 11

ESTIMATED DISTRIBUTION BY MARKET OUTLETS OF DOMESTIC STEEL MILL PRODUCTS
IN THE SIX SOUTHEASTERN STATES, 1967
(Volume in thousands of net tons)

Market Outlet	Carbon		Alloy		Stainless		All Steels	
	Volume	%	Volume	%	Volume	%	Volume	%
Bolts, nuts, etc.	58	1.2	10	2.2	1	2.2	69	1.3
Construction and contractors' products	2,232	45.9	93	20.7	8	17.4	2,333	43.5
Automotive	323	6.6	53	11.8	4	8.7	380	7.1
Rail transportation equipment	153	3.1	40	8.9	*	.5	193	3.6
Shipbuilding	150	3.1	41	9.1	*	1.0	192	3.6
Aircraft	10	.2	5	1.1	1	2.2	16	.3
Oil & gas drilling	0	0	*	.1	0	0	*	0
Agriculture	186	3.8	10	2.2	*	.6	196	3.6
Nonelectrical machinery	533	11.0	125	27.7	12	26.1	670	12.5
Electrical machinery	208	4.3	3	.7	1	2.2	212	3.9
Appliances & other domestic equipment	425	8.7	5	1.1	8	17.4	438	8.2
Containers	262	5.4	22	4.9	4	8.7	288	5.4
All others	327	6.7	43	9.5	6	13.0	376	7.0
Total	4,867	100.0	450	100.0	46	100.0	5,363	100.0

* Less than 550 net tons.

Source: Based on unpublished reported shipments data supplied by an industry source. These shipments represent approximately 85% of total demand for domestic steel mill products in the area.

The kinds of steel mill products used most in the Southeast are all made of carbon steel. Structural shapes, plates, and cold rolled sheets each accounted for about 11% of the demand for all domestic steel mill products in 1967, as shown in Table 12, which lists demand estimates by product kinds for the three types of steel. Other important carbon steel products were galvanized sheets, 8.1%, and hot rolled sheets, 7.6%. Miscellaneous carbon steel items -- concrete reinforcing bars, pipe, tubing, wire, wire rods, nails, and tin plate -- accounted for 30.2% of all steel products shipped, and the total for carbon steel was 90.7% of all shipments.

Only a few kinds of alloy steel are listed in the table. Hot rolled bars constituted 1.3% of all steel products shipped; cold finished bars, 0.4%; and plates, 1.9%. Unlisted alloy products accounted for 4.8% of total shipments. They included wire rods, structural shapes, pipe and tubing, wire, sheets, and strip.

Stainless steel products are given in more detail, although their percentage of total shipments is less than 1%. Cold rolled sheets and strip each made up 0.2% of all shipments.

Projected Demand -- 1975 and 1980. By 1975, demand for domestic steel mill products in the six-state area is expected to reach 8,260,000 tons, a 53% increase over the 1967 partial demand of 5,363,000 tons. By 1980, demand should be 10,447,000 tons, nearly double the 1967 figure. Area consumption should represent an ever-increasing proportion of U. S. demand, rising from 6.4% in 1967 to a projected 7.9% in 1975 and 9% in 1980.

Projections for all steel mill products and for carbon, alloy, and stainless steels are presented in Table 13. The table shows projected tonnages for these steels, each steel's share of the total six-state market, and the six-state area's percentage of U. S. consumption of each steel. Such projections are essential because a long lead time would be necessary for undertaking any new steelmaking project. The basic method used in the projections was simply to extend the gradual upward trends in the ratios between demand in the six-state area and the nation as a whole which were exhibited in the past, as previously shown in Table 9. However, no attempt has been made to base projections on the estimated 1967 total demand of 6,300,000 tons, since the extent to which each of the past trend data would require inflation cannot be ascertained.

Table 12

PARTIAL DEMAND FOR DOMESTIC STEEL MILL PRODUCTS
BY KINDS IN THE SIX SOUTHEASTERN STATES, 1967

Product Kinds	Net Tonnage (in thousands)	Percentag
Carbon:		
Structural shapes	592	11.0
Plates	590	11.0
Hot rolled bars	318	5.9
Cold finished bars	70	1.3
Cold rolled sheets	601	11.2
Cold rolled strip	59	1.1
Hot rolled sheets	408	7.6
Hot rolled strip	65	1.2
Galvanized sheets	432	8.1
Electrolytic galvanized sheets	18	.3
Mechanical tubing	94	1.8
Others	1,620	30.2
Total	4,867	90.7
Alloy:		
Hot rolled bars, (extra-high strength)	71	1.3
Cold finished bars	18	.4
Plates	102	1.9
Others	259	4.8
Total	450	8.4
Stainless:		
Cold rolled sheets	10	.2
Cold rolled strip	13	.2
Hot rolled sheets	1	*
Plates	5	.1
Hot rolled bars	3	.1
Cold finished bars	4	.1
Mechanical and pressure tubing	5	.1
Wiredrawn	1	*
Others	4	.1
Total	46	.9
GRAND TOTAL	5,363	100.0

* Less than 0.1%.

Source: Based on unpublished reported shipments data supplied by an industry source. These shipments represent approximately 85% of total demand for domestic steel mill products in the area.

Table 13

PROJECTED DEMAND FOR DOMESTIC STEEL MILL PRODUCTS IN THE SIX STATES, 1975 AND 1980 COMPARED WITH 1967

	Carbon	Alloy	Stainless	Total
1967				
1,000 Net Tons	4,867	450	46	5,363[a/]
Percent of Six-State Total	90.7	8.4	.9	100.0
Six-State Percent of U. S.	6.4	6.4	5.5	6.4
1975				
1,000 Net Tons	6,870	1,264	126	8,260
Percent of Six-State Total	83.2	15.3	1.5	100.0
Six-State Percent of U. S.	7.7	9.1	8.6	7.9
1980				
1,000 Net Tons	8,028	2,216	203	10,447
Percent of Six-State Total	76.8	21.2	1.9	100.0
Six-State Percent of U. S.	8.5	11.6	10.7	9.0

a/ Represents approximately 85% of estimated total demand of 6,300,000 tons for 1967.

Although carbon steel constitutes the vast majority of steel shipments, its share of the area market has been dropping. Therefore, a dip from 90.7% of total shipments to the area in 1967 to 83.2% in 1975 and 76.8% in 1980 was projected. On the other hand, the six-state area's share of U. S. carbon steel demand was estimated to rise from 6.4% in 1967 to 7.7% in 1975 and to 8.5% in 1980.

Alloy steel, which has had the most rapid rate of growth in the area (Table 9), was projected to rise from 8.4% of total area demand for steel in 1967 to 15.3% in 1975 and 21.2% in 1980. The area's share of U. S. alloy steel demand should increase from 6.4% in 1967 to 9.1% in 1975 and 11.6% in 1980. In tonnage, southeastern consumption of alloy steels may reach 1,264,000 net tons by 1975 and 2,216,000 net tons by 1980 -- increases over the 1967 volume of 180% and 392%, respectively.

Stainless steel has exhibited moderate growth in the six-state area. Its percentage of all steel shipments in the area has been projected to increase from 0.9% in 1967 to 1.5% by 1975 and 1.9% by 1980. The area's share of U. S. stainless steel demand was estimated at 8.6% in 1975 and 10.7% in 1980, compared with 5.5% in 1967.

Imports

Imports have been for many years, and are today, a more serious problem to U. S. steel producers in serving the six-state southeastern market than in sell ing to the national market. The six-state area has experienced a rapid increas in imports in the past eight years, in terms of both absolute volume and share of total area consumption. Even with the more rapid rate of increase nationwid in the last half-decade, in 1967 imports constituted 16.8% of total usage in the six states as compared with 12.2% in the U. S. Approximately 28% of the imports into the Southeast in 1967 were bar products, and nearly 90% of all steel mill products imported through southeastern ports were shipped from just four countries.

Imports of steel mill products have provided substantial competition to domestic producers in serving the southeastern market for a number of years, long before the volume of imports became a problem nationwide. Foreign steel producers have been very successful in selling in the Southeast -- largely because of its distance from major producing areas in the U. S.

The steady increase in the volume of imports into the six-state area since 1960 is shown in Table 14, which lists import tonnage through the customs districts of Wilmington, North Carolina; Charleston, South Carolina; Savannah, Georgia; Tampa and Miami, Florida; and Mobile, Alabama. The area's imports totaled 1,082,759 tons in 1967, over 2½ times the 1960 volume of 417,546 tons. Florida ports alone have consistently accounted for approximately one-half of the total. The Savannah customs district has the smallest volume, representing less than 10% of the six-state total.

Although the six-state share of U. S. demand for domestic steel mill products has risen steadily, growing from 4.87% of the U. S. in 1960 to 6.39% in 1967 (Table 9), the area's percentage of total U. S. imports has been declining falling from 12.43% of the U. S. in 1960 to 9.45% in 1967 (Table 15). It is true that imports represent an ever-increasing proportion of total consumption in the six-state area and that this proportion is far greater in the area than in the nation as a whole; while imports rose from 4.7% of U. S. consumption in 1960 to 12.2% in 1967, they increased from 10.8% to 16.8% of consumption in the six states during the same period, assuming that imports through ports in the six states are consumed within the area. However, in the last four or five years, the volume of imports has grown at a much more rapid rate nationwide than in the area.

Table 14

IMPORTS OF STEEL MILL PRODUCTS BY CUSTOMS DISTRICTS IN THE SIX-STATE AREA, 1960-1967
(in net tons)

Year	Wilmington	Charleston	Savannah	Tampa	Miami	Mobile	Total
1960	47,362	44,367	32,207	226,186		67,424	417,546
1961	44,816	62,152	35,767	250,514		78,941	472,190
1962	49,629	75,335	44,309	244,311		104,550	518,134
1963	68,273	77,323	57,944	335,444		130,087	669,071
1964	79,280	88,690	56,922	339,787		136,720	701,399
1965	84,474	108,479	88,730	493,139		221,148	995,970
1966	119,671	146,364	82,218	260,114	183,239	191,464	983,070
1967	121,057	151,581	105,504	320,228	185,338	199,051	1,082,759

Source: American Iron and Steel Institute, Annual Statistical Report.

Table 15

IMPORTS OF STEEL MILL PRODUCTS, SIX-STATE AREA AND U. S., 1960-1967

	Six-State Imports[a]		U. S. Imports		
	Net Tons	Index 1960 = 100	Net Tons	Index 1960 = 100	Six-State % of U. S.
1960	417,546	100.0	3,358,752	100.0	12.43
1961	472,190	113.9	3,163,233	94.2	14.92
1962	518,134	124.1	4,100,039	122.1	12.64
1963	669,071	160.2	5,446,326	162.2	12.27
1964	701,399	168.0	6,439,635	191.7	10.89
1965	995,970	238.5	10,383,021	309.1	9.59
1966	983,070	235.4	10,753,022	320.1	9.14
1967	1,082,759	259.3	11,454,502	341.0	9.45

a/ Through the ports of Wilmington, Charleston, Savannah, Tampa, Miami, and Mobile.

Source: American Iron and Steel Institute, Annual Statistical Report, 1967.

This trend may be due, at least in part, to the huge influx of foreign steel mill products into the Great Lakes region through the St. Lawrence Seaway in recent years. Actually, imports represented a nearly negligible portion of consumption on the national level until 1959, the year the St. Lawrence Seaway opened, when they jumped from 1,707,000 to 4,396,000 net tons and exceeded exports for the first time. (See Tables 2 and 3.) From 1960 through 1963, U. S. imports grew at about the same rate as those into the six-state area, as shown in Table 15. But in 1964, U. S. volume began to mushroom as use of the Seaway got into full swing. Although there was a large increase in imports through southeastern ports in 1965, the overall increase nationwide was proportionately far greater. By 1967, U. S. imports had grown to 341% of the 1960 total, compared with 259% for the six-state area.

Approximately 86.47% of the steel mill products imported through the six customs districts in the Southeast fall into 10 major groups. (See Table 16.) In 1967, bar products, which include concrete reinforcing bars, bar shapes, and hot rolled bars, constituted 27.51% of the total. Other major items included wire rods, 15.17%; structural shapes, 12.64%; and welded pipe and tubing, 10.45%.

Table 16

STEEL MILL PRODUCTS IMPORTED THROUGH CUSTOMS DISTRICTS IN THE SIX SOUTHEASTERN STATES, 1967

Products	Net Tons	Percent
Wire rods	164,281	15.17
Structural shapes	136,868	12.64
Plates	66,622	6.15
Concrete reinforcing bars	99,952	9.23
Bar shapes under 3"	126,630	11.70
Bars, hot rolled, carbon	71,274	6.58
Welded pipe and tubing	113,124	10.45
Round and shaped wire	65,285	6.03
Wire nails	44,674	4.13
Sheets, coated, galvanized	47,516	4.39
Others	146,497	13.53
Total	1,082,723	100.00

Source: American Iron and Steel Institute, Annual Statistical Report, 1967.

Nearly 90% of all the steel mill products imported through these southeastern ports in 1967 originated in just four countries -- Belgium-Luxembourg, Japan, West Germany, and France. (See Table 17.) Over one-third of the total was shipped from Belgium-Luxembourg, and Japan and West Germany each contributed approximately one-fifth.

Exports of steel products through ports in the six-state area are insignificant. In 1966, exports of iron and steel products totaled 97,000 short tons or less than one-tenth of imports in that year.

The Basis for Market Growth -- Steel Fabrication in the Six-State Area

The rapid growth of demand for domestic steel and imports is a clear reflection of the mushrooming growth of steel fabricating industries in the six-state area. Employment in the fabricating industries in the area more than doubled in the decade preceding 1967, reaching a total of nearly 500,000 workers in about 2,000 plants. This growth record far outstrips that of the U. S. as a whole -- fabricating employment in the area grew by 105% during the

Table 17

VOLUME OF STEEL MILL PRODUCTS IMPORTED THROUGH CUSTOMS DISTRICTS IN THE SIX SOUTHEASTERN STATES BY COUNTRY OF ORIGIN, 1967

Country	Net Tonnage	% of Total
Belgium-Luxembourg	384,423	35.51
Japan	241,687	22.32
West Germany	207,847	19.20
France	118,023	10.90
United Kingdom	37,217	3.44
Brazil	26,922	2.49
Others	66,604	6.14
Total	1,082,723	100.00

Source: American Iron and Steel Institute.

decade, or nearly three times the 39% fabricating employment increase recorded for the total U. S.

The fabricating industries for which these comparisons are drawn are listed in Table 18. The nine steel using industries shown are a major factor in the U. S. economy, accounting for nearly one-half of the manufacturing sector. They spend 45% of all the money spent by manufacturing plants for materials, account for 45% of all capital expenditures, consume 40% of all purchased electrical energy, employ 49% of all industrial workers, and pay 55% of the total manufacturing payroll.[1/]

As shown in Table 18, all of the major steel-using industries except prima metals registered impressive gains in the six-state area during the 1957-1967 period. The total number of plants increased from 1,123 in 1957 to 1,984 in 1967, while employment increased from 227,792 to 465,974. The increases for fabricated metal products, electrical and nonelectrical machinery, and transportation are most impressive because these industries already had a substantial base in 1957.

1/ Metalworking Marketguide, Iron Age, Philadelphia, Pa., 1967.

Table 18

NUMBER OF PLANTS AND EMPLOYMENT OF STEEL FABRICATING INDUSTRIES IN THE SIX SOUTHEASTERN STATES, 1957 AND 1967

Industries	1967 No. of Plants	1967 Employment No.	1967 Employment % of U. S.	1957 No. of Plants	1957 Employment No.	1957 Employment % of U. S.
Ordnance and Accessories	7	4,330	1.48	9	2,321	1.88
Metal Furniture	83	12,870	9.36	45	5,245	5.29
Primary Metals	212	66,730	5.04	153	63,860	5.43
Fabricated Metal Products	661	78,412	6.28	381	34,032	3.58
Machinery (Except Electrical)	491	74,597	4.28	295	32,373	2.79
Electrical Machinery and Equipment	223	95,504	5.52	95	29,325	2.89
Transportation	203	110,615	5.72	108	54,776	3.53
Instruments, Photo Equipment, Clocks	34	10,881	3.17	15	3,090	1.35
Miscellaneous Manufacturing Industries (Metal)	70	12,035	5.53	22	2,770	1.72
Total	1,984	465,974	5.19	1,123	227,792	3.52

Source: Metalworking Marketguide, Iron Age, 1957 and 1967.

The nine major industries shown in Table 18 comprise about 190 smaller, more specialized (four-digit S.I.C.) industries. Detailed information on number of plants, employment, percentage change in employment between 1957 and 1967, and employment in each of these 190 industries in the six-state area as a percent of the U. S. total are given in Appendix 4. Ten of these 190 industries in the six-state area scored over 1,000% gains in employment during the decade. Shown in Table 19, these 10 industries are examples of the extremely rapid growth which has taken place within the area's metal fabricating complex. Nine of these industries use steel mill products as their basic material; the exception is small boat builders, which frequently use materials other than steel.

The 10 industries shown in Table 19 can also be used to suggest the potential for additional growth of the area's fabricating complex. Many of the limited number of examples shown (see also Appendix 6) have grown so far to

Table 19

METAL-USING INDUSTRIES IN THE SIX-STATE AREA
WITH OVER 1,000% GAINS IN EMPLOYMENT BETWEEN 1957 AND 1967

SIC	Industry	1967			% Increase in Employment, 1957-1967
		No. of Plants	Employment	% of U. S. Employment	
3554	Paper Machinery	4	387	1.71	1,835
3562	Ball and Roller Bearings	3	1,075	1.77	1,244
3571	Computing Machines and Cash Registers	11	9,460	5.76	1,871
3579	Other Office and Store Machines	4	528	2.76	1,157
3613	Switch Gear and Switch-load Apparatus	13	5,092	8.33	1,570
3621	Motors, Generators, and Generator Sets	17	4,306	3.30	2,976
3624	Carbon Electrical Products	2	610	5.65	2,552
3716	Auto Trailer Coaches	30	4,176	18.11	1,879
3732	Small Boat Building	23	2,786	20.58	1,272
3999	Miscellaneous Metal Products	7	1,806	8.56	2,303

Source: Metalworking Marketguide, Iron Age, 1957 and 1967.

only a fraction of their potential size. More than half of them account for less than 6% of the total U. S. employment and output. In contrast, the six-state area contains about 12.9% of the U. S. population, 11.6% of the U. S. nonagricultural employment, and 10.1% of total personal income.

Although the area's total steel fabricating complex cannot be expected to grow suddenly to 12.9% of the U. S. total -- the area's portion of U. S. population -- it can be expected to narrow the gap by growing more rapidly than the U. S. fabricating total. This has been the case in the recent past. As can be seen in Table 20, which shows percentage increases in employment for the

Table 20

PERCENTAGE INCREASES IN EMPLOYMENT OF STEEL FABRICATING INDUSTRIES IN THE UNITED STATES AND THE SIX SOUTHEASTERN STATES BETWEEN 1957 AND 1967

Industries	U. S.	Six States
Ordnance and Accessories	138	87
Metal Furniture	39	145
Primary Metals	13	4
Fabricated Metal Products	31	130
Machinery (Except Electrical)	50	130
Electric Machinery and Equipment	71	226
Transportation	25	102
Instruments, Photo Equipment, Clocks	50	252
Miscellaneous Manufacturing Industries (Metal)	35	334
Total (9 industries)	39	105

Source: Metalworking Marketguide, Iron Age, 1957 and 1967.

nine major steel fabricating industries, all groups except ordnance and primary metals experienced much greater growth in the six states than in the United States between 1957 and 1967. The overall growth of the nine groups was 105%, or nearly three times the 39% growth record for the U. S.

The more rapid growth of metal fabricating industries in the area reflects the economic progress made in the six southeastern states since World War II,

details of which will be presented in a later section. This impressive growth presages a greater demand for steel mill products in the area in the future.

Production Capacity

Operating at full capacity, steel mills in the six-state area can produce about 7 million tons of ingot annually, equivalent to approximately 5 million tons of finished steel mill products. Intermediate steel mill capacity totals about 5 million tons. Finishing mill capacity considerably exceeds the 5-million-ton potential output of intermediate mills. Actual production of basi intermediate, and finished steel mill products is likely to be less than capac ity; however, available data do not indicate what part of the total installed capacity is modern enough to produce competitively priced products.

The area's basic steelmaking facilities, or ingot furnaces, are listed in Table 21 in terms of kind, number, and tons per heat. Electric furnaces are scattered in all six states, while basic oxygen, open hearth, and Bessemer

Table 21

STEEL FURNACE FACILITIES IN THE SIX SOUTHEASTERN STATES, 1967

State	Electric		Basic Oxygen		Open Hearth		Bessemer		Vacuum Arc	
	No.	Tons/ Heat	No.	Tons/ Heat	No.	Tons/ Heat	No.	Tons/ Heat	No.	Tons/ Heat
Alabama	7	232	2	150	21	380	3	24	-	-
Florida	3	50	-	-	-	-	-	-	-	-
Georgia	2	85	-	-	-	-	-	-	-	-
North Carolina	2	40	-	-	-	-	-	-	7	9
South Carolina	2[a/]	60[a/]	-	-	-	-	-	-	-	-
Tennessee	3	35	-	-	-	-	-	-	-	-
Total	19	502	2	150	21	380	3	24	7	9

a/ The capacity of Owen Electric Steel Company is not available. The company according to a private source, has two electric furnaces with small capacity.

Source: American Iron and Steel Institute, Directory of Iron and Steel Works of the United States and Canada, 1967.

furnaces are concentrated in Alabama only. The 19 electric furnaces in the area can produce 1.9 million net tons of steel ingot a year. However, two of them (Republic Steel) are not in operation. In comparison, the basic oxygen furnaces in the area have a total capacity of approximately 1 million net tons, and open hearth furnaces, 3.7 million net tons. Production by Bessemer and vacuum arc furnaces is very small in the area; vacuum arc furnaces are used in the production of small quantities of specialty steel.

Total steel ingot capacity in the area is estimated at 6.7 million to 7 million net tons a year (including the two electric furnaces not in operation), but in processing from ingots to steel mill products about one-third of this raw steel is lost as scrap which is sent back to the furnaces for remelting. Therefore, the actual ingot tonnage embodied in steel products would be 4.5 million to 4.7 million net tons a year if the furnaces in the area were used to full capacity.

The intermediate steel mill capacity in the area is consistent with ingot capacity -- the five blooming mills can handle 4.9 million net tons of steel per year. In addition, the area has four billet mills. (See Table 22.) (See Table 22.)

Table 22

INTERMEDIATE STEEL MILL FACILITIES IN THE SIX SOUTHEASTERN STATES, 1967

State	Bloom		Billet	
	No.	A	No.	A
Alabama	4	4,426	2	1,165
Florida	-	-	-	-
Georgia	1	480	1	480
North Carolina	-	-	-	-
South Carolina	-	-	1	200
Tennessee	-	-	-	-
Total	5	4,906	4	1,845

A = Annual rolling capacity in thousands of net tons.

Source: Directory of Iron and Steel Works of the United States and Canada, 1967.

The area's steel finishing mills, which process blooms, billets, and slabs[1/] into steel products, are listed in Tables 23 and 24. From a quick re view of these tables, it is apparent that finishing mill capacity greatly exceeds the capacity of intermediate mills in the area. This disparity indicat two things. First, semifinished steel products, such as blooms, billets, and slabs, may be shipped in from other regions, by independent companies as well as by at least one integrated steel company, or from abroad to meet the needs of local finishing mills. Second, the greater finishing capacity is required to meet the demand for varied end products. The number of plants and their capacities for producing rods, bars, strip, plates, sheets, rails, cotton tie structural shapes, and tin plate are given in Table 23. A brief summary of information on the number of plants producing wire, nails, tubing, pipe, forgings, galvanized sheet, bolts and nuts, and pre-engineered steel buildings is given in Table 24.

The southeastern area lacks sufficient capacity in many finished steel production categories. According to a trade source, the area is lacking in commercial forging capacity and needs more facilities for making galvanized sheets, bolts and nuts, pre-engineered steel buildings, and certain special tubings.

The finishing capacity in the area also has limitations other than the quantity of steel products that can be produced. Mill facilities and equipmer are usually designed to handle a specific kind of steel or a specific range of thickness or size. Consequently, many of the specific types of steel products needed in the Southeast cannot be produced with existing equipment. For example, commonly used large-sized sheet and plate are not made in the area. Th widest sheet produced is 48 inches and the longest plate is 136 inches. Major portions of the heavy structural shapes used for commercial building in the Southeast have to be brought in from northern mills.

A large majority of the steelmaking facilities in the six-state area is concentrated in Alabama. Only electric furnaces and bar finishing mills are scattered in all six states. In Alabama, U. S. Steel Corporation and Republic Steel Corporation account for much of the capacity. A detailed breakdown of

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1/ Slabs are similar to billets but larger in size and more rectangular in shape. They are made with the same facilities used in making billets.

Table 23

SELECTED STEEL FINISHING MILL FACILITIES IN THE SIX SOUTHEASTERN STATES, 1967

State	Rods		Bars		Strip		Plates		Sheets		Rails		Cotton Ties		Structural Shapes		Tin Plate	
	No.	A	No.	A	No.	A	No.	A	No.	A	No.	A	No.	A	No.	A	No.	A
Alabama	2	480	7	765	4	2,290	2	1,019	6	4,551	1	581	1	70	1	396	1	263
Florida	-	-	1	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Georgia	1	300	1	136	2	106	-	-	-	-	-	-	-	-	-	-	-	-
North Carolina	-	-	5	112	-	-	-	-	-	-	-	-	-	-	-	-	-	-
South Carolina	-	-	1	200	-	-	-	-	-	-	-	-	-	-	1	N. A.	-	-
Tennessee	-	-	4	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	3	780	19	1,403	6	2.396	2	1,019	6	4,551	1	581	1	70	2	396	1	263

A = Annual rolling capacity in thousands of net tons.

Source: Directory of Iron and Steel Works of the United States and Canada, 1967.

Table 24

OTHER STEEL FINISHING MILL FACILITIES IN THE SIX SOUTHEASTERN STATES, 1967

State	Wire	Nails	Tubing	Pipe	Forgings	Galvanized Sheets	Bolts & Nuts	Pre-Engineered Buildings
Alabama	2	-	10	1	1	1	1	-
Florida	2	1	-	-	-	-	-	-
Georgia	1	1	3	-	-	1	-	1
North Carolina	-	-	-	-	-	-	-	-
South Carolina	1	1	-	-	-	-	1	-
Tennessee	-	-	5	1	1	-	-	-
Total	6	3	18	2	2	2	2	1

Source: Directory of Iron and Steel Works of the United States and Canada, 1967.

the basic, intermediate, and finished steel mill facilities in the six-state area, listed by individual companies, is given in Appendix 5.

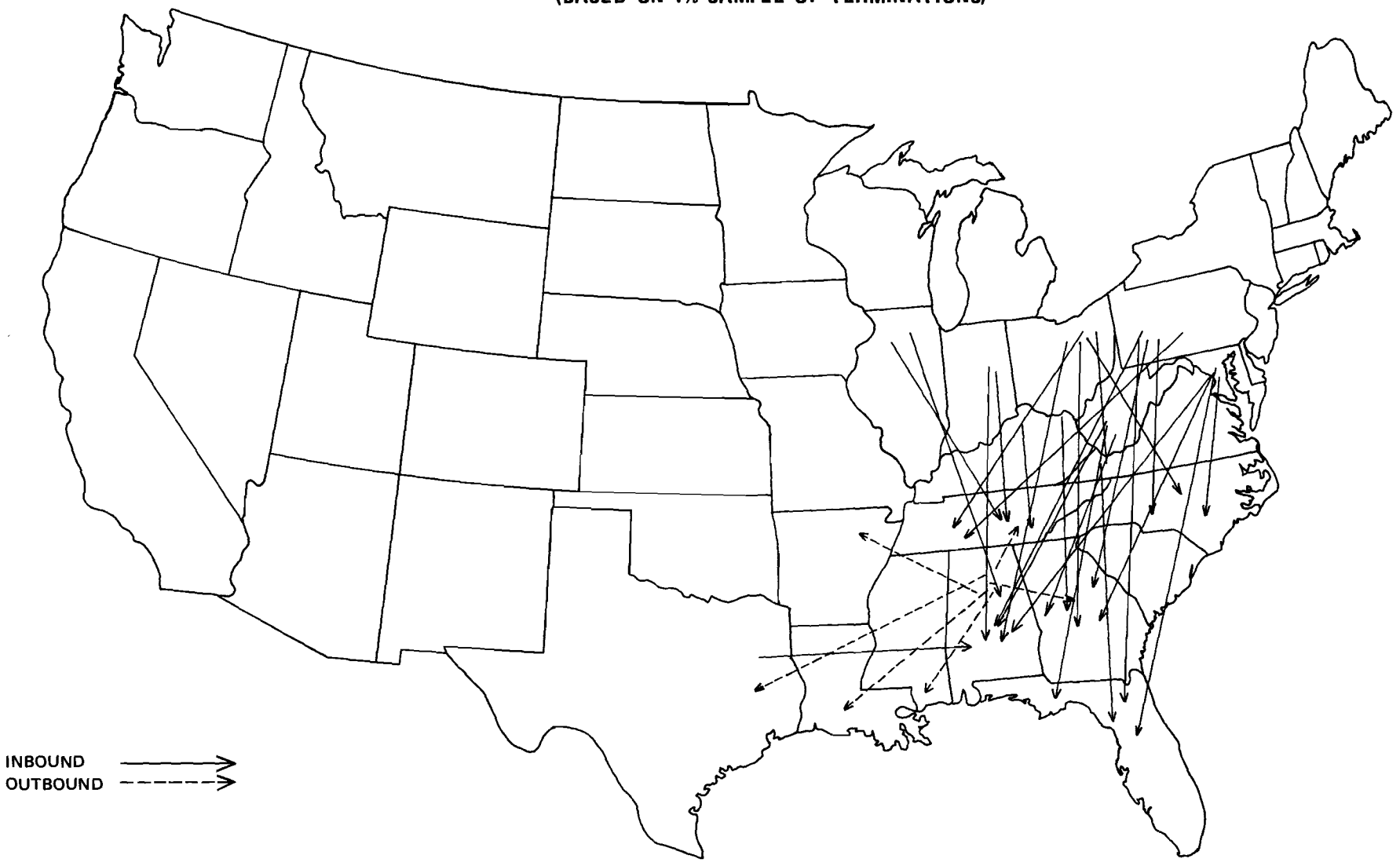
The Supply-Demand Deficit

More than 4 million tons of finished steel mill products were shipped to the six-state market from production points located outside the area in 1967. Because of the growing disparity between area demand and supply, the supply-demand deficit -- the quantity of steel brought into the area from outside suppliers -- is increasing rapidly. Unless additional steelmaking facilities are installed in the area, the deficit is expected to grow at an annual rate of 352,000 tons over the next several years and by an even larger amount in succeeding years.

The consumption of steel mill products in the area totaled approximately 7.4 million tons in 1967. Some 1.1 million tons of this total were supplied by foreign steelmakers and imported through the six deepwater ports serving the area. The remaining 6.3 million tons were supplied by domestic steelmakers; according to several sources, at least one-half the domestic steel used, or roughly 3 million tons, is brought in from production facilities located outside the area.

These conclusions imply that only about 3 million tons of the area's domestic steel consumption is supplied by local steel mill facilities. Several factors support this implication. For example: (1) Actual capacity for producing finished steel products is considerably larger than 4 million tons, but some of it is not used either because it is inefficient or because it is owned by small firms which cannot control their sales well enough to operate continuously at levels near capacity. (2) Some capacity cannot produce the specific products which are needed in the area. (3) Some production may be exported, although this is not believed to be a major factor since the U. S. as a whole exports very little steel -- exports constituted only 1.8% of total steel mill product shipments in 1967. (4) Basic steelmaking facilities in the area have a total ingot capacity equivalent to only 4.5 million to 4.7 million tons of finished steel products. (5) Some local steel production is shipped outside the area. The area's major steelmaking complex, in Alabama, was originally designed to supply the entire South, not just the six-state area. As may be seen on Map 1, the states to which Alabama mills ship steel mill products include Arkansas, Louisiana, Mississippi, and Texas.

MAP 1
INBOUND AND OUTBOUND SHIPMENTS OF STEEL
MILL PRODUCTS IN THE SIX SOUTHEASTERN STATES, 1964
(BASED ON 1% SAMPLE OF TERMINATIONS)



Some indication of the locations of steelmaking facilities which ship products into the six-state area may also be derived from Map 1. Additional details are presented in Table 25 and Appendix 6. Results of a 1% sample (11,692 tons) of inbound rail shipments to the six states in 1964, published in Carload Waybill Statistics, 1964, show that the majority of the shipments came from Ohio, Pennsylvania, and Maryland. The same source shows that all of the steel products shipped out of the six-state area by rail, in a 1,681-ton sample, originated in Alabama.

The disparity between area supply and demand appears to be widening. Historical steel production data are not available, but output is believed to have grown only slightly in recent years. The area's entire primary metals industry, including its active aluminum industry, increased employment by only 4.5% in the 10 years between 1957 and 1967.[1/] In contrast, the total steel-using complex in the area increased employment by 104.6% in that period.[1/] The partial demand for domestic steel shown in Table 9 was up by 54.9% in the seven years between 1960 and 1967, and imports grew by 159.3% during the same period.

The growing disparity can also be shown in terms of the area's share of total U. S. activity. As may be seen in Table 18, the six-state area's share of total U. S. employment in the primary metals industry decreased from 5.43% in 1957 to 5.04% in 1967. In contrast, Table 9 shows the partial demand for domestic steel growing from 4.87% of the U. S. in 1960 to 6.39% in 1967 -- a shorter period.

The demand side of the deficit equation is expected to grow even more rapidly in the future. The projected partial demand for domestic steel presented in Table 13 indicates that the market in the six southeastern states will grow by about 362,000 tons annually between 1967 and 1975, and by some 437,000 tons a year between 1975 and 1980.

The 7.4-million-ton market for steel mill products in the area will be growing in large increments in future years. A large part of the current market must be satisfied by mills located at distant northern sites or abroad. Consequently, this market, which is already ripe for exploitation by steel producers, will offer multiple investment opportunities in coming years.

1/ Based on Table 18.

Table 25

INBOUND RAIL SHIPMENTS OF STEEL MILL PRODUCTS TO THE SIX SOUTHEASTERN STATES, 1964
(Based on 1% sample of terminations)

Origin	Tons	%	Destination	Tons	%
Ohio	3,992	34	Alabama	4,384	37
Pennsylvania	2,697	23	Tennessee	2,508	22
Maryland	1,512	13	Florida	1,902	16
Indiana	875	8	Georgia	1,783	15
Illinois	778	7	North Carolina	1,115	10
West Virginia	852	7	Total	11,692	100
Kentucky	512	4			
Texas	458	4			
Total	11,692	100			

Source: Interstate Commerce Commission, Bureau of Transport Economics and Statistics, Carload Waybill Statistics, 1964 (state-to-state distribution, traffic and revenue, one percent of terminations in 1964), Statement SS-6, Washington, D. C., August 1967.

GEORGIA'S POSITION FOR SERVING THE SOUTHEASTERN MARKET

Demand exceeds supply in the Southeast, as has been shown -- some 4 million tons of steel are brought in each year from northern steel producing centers or from abroad. A very brief glance at Georgia's position indicates that the state has at least three major advantages for serving this market -- lower freight costs, faster delivery, and lower labor costs than are found at major steel producing centers.

Steel mills could be built in Georgia based on one or more of three sources of raw materials -- scrap, imported ores, or possibly local ores. By all indications, Georgia and the five bordering states which make up Georgia's natural market area are continuing to develop the strong economic base which will ultimately lead to the establishment of additional steelmaking facilities in the state.

Freight Costs and Delivery Time

Both the lower freight costs and the speedier delivery which a steel mill in Georgia could offer to southeastern fabricators would work strongly to the advantage of a Georgia mill -- primarily because the resulting rapid growth of the fabricating industry would enlarge the steel products market still further.

Transportation costs to the southeastern market are much lower from Georgia than from major steel producing areas. A comparison of rail freight rates for steel mill products is given in Appendix 7. These rates are given on the basis of minimum weights of 40,000 pounds, 80,000 pounds, and 100,000 pounds from nine steel producing centers in the eastern part of the United States to 28 steel consuming cities in the six southeastern states. It is apparent that Atlanta has the lowest transportation costs to most of the cities in the six-state area except Birmingham to Alabama cities and Birmingham to Memphis and Nashville in Tennessee.

Table 26 indicates the average freight rates per 100 pounds of steel mill products shipped from the nine steel producing centers to each of the six states. The rates are the average of the different cities in each state given in Appendix 7. The closest rival to Atlanta is Birmingham. Even Birmingham cannot compete with Atlanta in the states of Florida, Georgia, North Carolina, and South Carolina. Other steel producing centers in the East, such as

Table 26

AVERAGE RAIL FREIGHT RATES FOR STEEL MILL PRODUCTS
FROM NINE STEEL PRODUCING CENTERS TO THE SIX-STATE AREA, 1968
(in cents per 100 lbs. and based on 100,000 lbs. minimum weight)

	From								
To	Atlanta Ga.	Bethlehem Pa.	Birmingham Ala.	Buffalo N. Y.	Detroit Mich.	Middleton O.	Pittsburgh Pa.	Sparrows Point Md.	Weirton W. Va.
Alabama	31.83	86.00	18.67	83.67	74.17	60.33	76.67	81.33	68.67
Florida	52.50	92.00	61.60	102.20	97.80	88.20	96.80	87.60	95.80
Georgia	19.11	76.11	31.61	83.78	74.05	61.28	75.00	69.50	71.17
North Carolina	39.25	54.25	54.75	70.75	69.75	60.75	59.50	43.50	68.13
South Carolina	26.67	65.17	42.17	79.00	71.33	59.50	69.00	57.50	68.50
Tennessee	33.25	79.13	30.75	72.00	61.13	45.00	64.63	73.75	57.38

Source: Appendix 7.

Bethlehem, Buffalo, Detroit, Middleton, Pittsburgh, Sparrows Point, and Weirton, cannot even approach the freight savings possible from Atlanta or any Georgia location to major steel consuming areas in the southeastern states. Transportation costs from major northern steel producing centers are several times higher than from Atlanta or from any Georgia location to most southeastern cities.

Table 27 compares the transportation costs of shipping 400,000 tons of steel mill products from the nine steel producing centers to the six-state area. The difference is substantial. Millions of dollars can be saved in shipping costs on a volume which is approximately the output of a small to medium-sized steel plant.

Georgia's central location in the Southeast enables the state to offer convenient, speedy delivery to the southeastern market. One indication of the state's strategic position is the fact that Georgia had nearly one-fourth of the six-state area's metal service centers[1/] in 1963; these 44 establishments accounted for almost one-third of the dollar volume of sales in the area, or approximately $95 million. (See Table 28.) Florida had more establishments, but sales were only one-half as great as Georgia's. Sales in Alabama, North Carolina, and Tennessee ranged from 14% to 18% of the area total, while South Carolina accounted for less than 4%.

One of Georgia's major assets in serving the southeastern market is its excellent statewide transportation network with Atlanta as the hub. First-morning delivery service is available from Atlanta to most of the six-state area on both carload and truckload shipments.

All but 11 of Georgia's 159 counties have rail service. Thirty carriers, of which 11 are Class I railroads, operate about 5,800 miles of line track in the state. Two vast electronic freight yards are operated in Atlanta, and flat yard switching is available at Augusta, Columbus, Macon, and Savannah. Map 2 indicates normal transit times on carload shipments from Atlanta to major cities in the nation by railroad freight service. One-day service is available to Georgia cities and to parts of the surrounding five states, and the second-day delivery range extends to Orlando, New Orleans, Memphis, Cincinnati, and

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1/ The percentage of the area steel market supplied by service centers is unknown, and the percentage of these centers' sales represented by steel products also is unknown.

Table 27

RAIL FREIGHT COSTS FOR SHIPPING 400,000 TONS OF STEEL MILL PRODUCTS FROM NINE STEEL PRODUCING CENTERS TO THE SIX-STATE AREA, 1968
(in thousands of dollars and based on 100,000 lbs. minimum carload weight)

	From								
To	Atlanta Ga.	Bethlehem Pa.	Birmingham Ala.	Buffalo N. Y.	Detroit Mich.	Middleton O.	Pittsburgh Pa.	Sparrows Point Md.	Weirton W. Va.
Alabama	2,547	6,880	1,493	6,693	5,933	4,827	6,133	6,507	5,493
Florida	4,200	7,360	4,928	8,176	7,824	7,056	7,744	7,008	7,664
Georgia	1,529	6,089	2,529	6,702	5,924	4,902	6,000	5,560	5,694
North Carolina	3,140	4,340	4,380	5,660	5,580	4,860	4,760	3,480	5,450
South Carolina	2,133	5,213	3,373	6,320	5,707	4,760	5,520	4,600	5,480
Tennessee	2,660	6,331	2,460	5,760	4,890	3,600	5,170	5,900	4,590

Source: Appendix 7.

Table 28

METAL SERVICE CENTERS IN THE SIX-STATE AREA, 1963
(all types)

	Establishments		Sales	
	No.	%	$1,000	%
Alabama	29	15.3	41,489	14.1
Florida	56	29.5	47,652	16.2
Georgia	44	23.2	94,998	32.3
North Carolina	23	12.1	46,376	15.8
South Carolina	13	6.8	10,941	3.7
Tennessee	25	13.1	52,544	17.9
Six-State Total	190	100.0	294,000	100.0
United States	2,346		4,987,935	
Six-State % of U. S.	8.1		5.9	

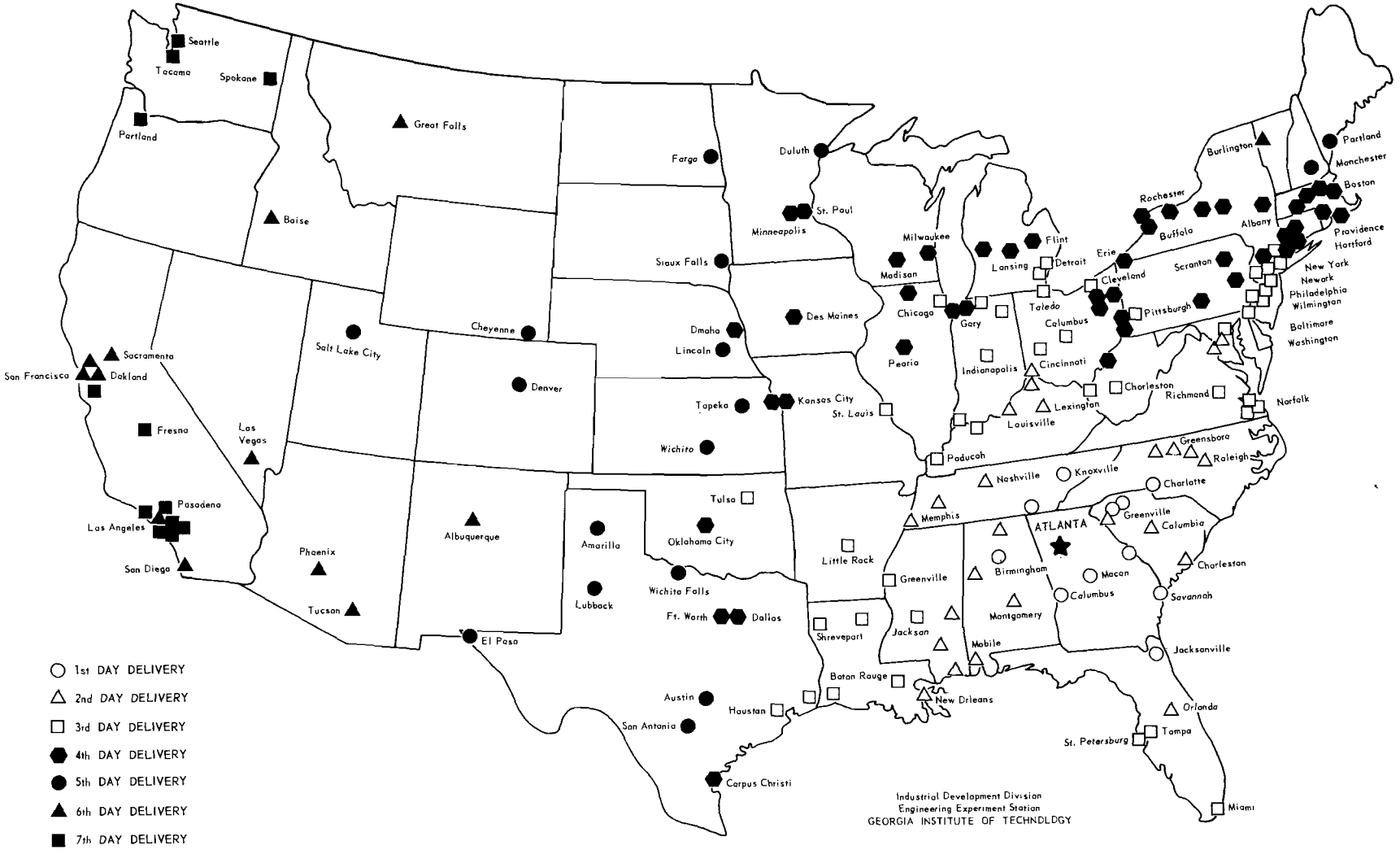
Source: U. S. Bureau of the Census, Census of Business, 1963, Wholesale Trade.

Baltimore. Transit times on shipments from principal points in Georgia other than Atlanta seldom exceed Atlanta's service by more than one day and frequently are the same or less than from Atlanta. Expedited service is available upon request.

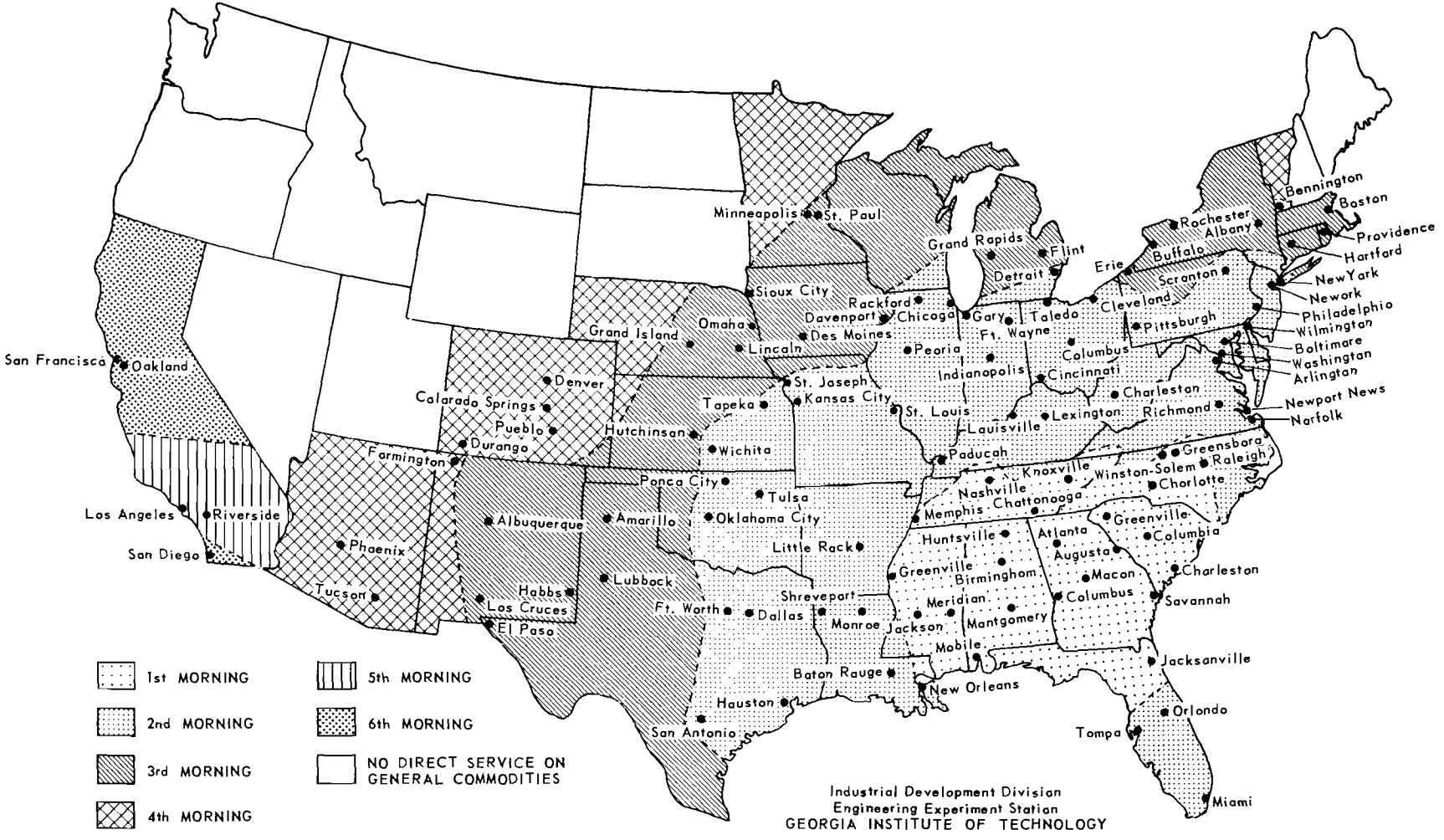
Georgia is served by about 100 scheduled motor freight carriers, many of which operate wholly in interstate transportation, as well as some 400 irregular route carriers, contract haulers, and specialized commodity carriers. At least 30 Georgia cities are served by a minimum of 22 interstate carriers of general commodities. Maps 3 and 4 show transit times on direct truckload and less-than-truckload shipments from Atlanta. First-morning delivery is available to six southern states and the northern half of Florida on truckload shipments and to a slightly smaller area on less-than-truckload shipments. Map 5 indicates the areas receiving one-day truckload service from six other Georgia cities.

Georgia currently is in the midst of one of the largest airport construction programs in the country. In addition to 12 major commercial airports with a total of over 700 arrivals and departures daily, 155 community airports, 80 of them both paved and lighted, are scattered throughout the state. Atlanta has one of the busiest airports in the nation. Only three other U. S. cities

MAP 2
RAILROAD FREIGHT SERVICE: NORMAL TRANSIT TIMES ON CARLOAD SHIPMENTS FROM ATLANTA, GEORGIA

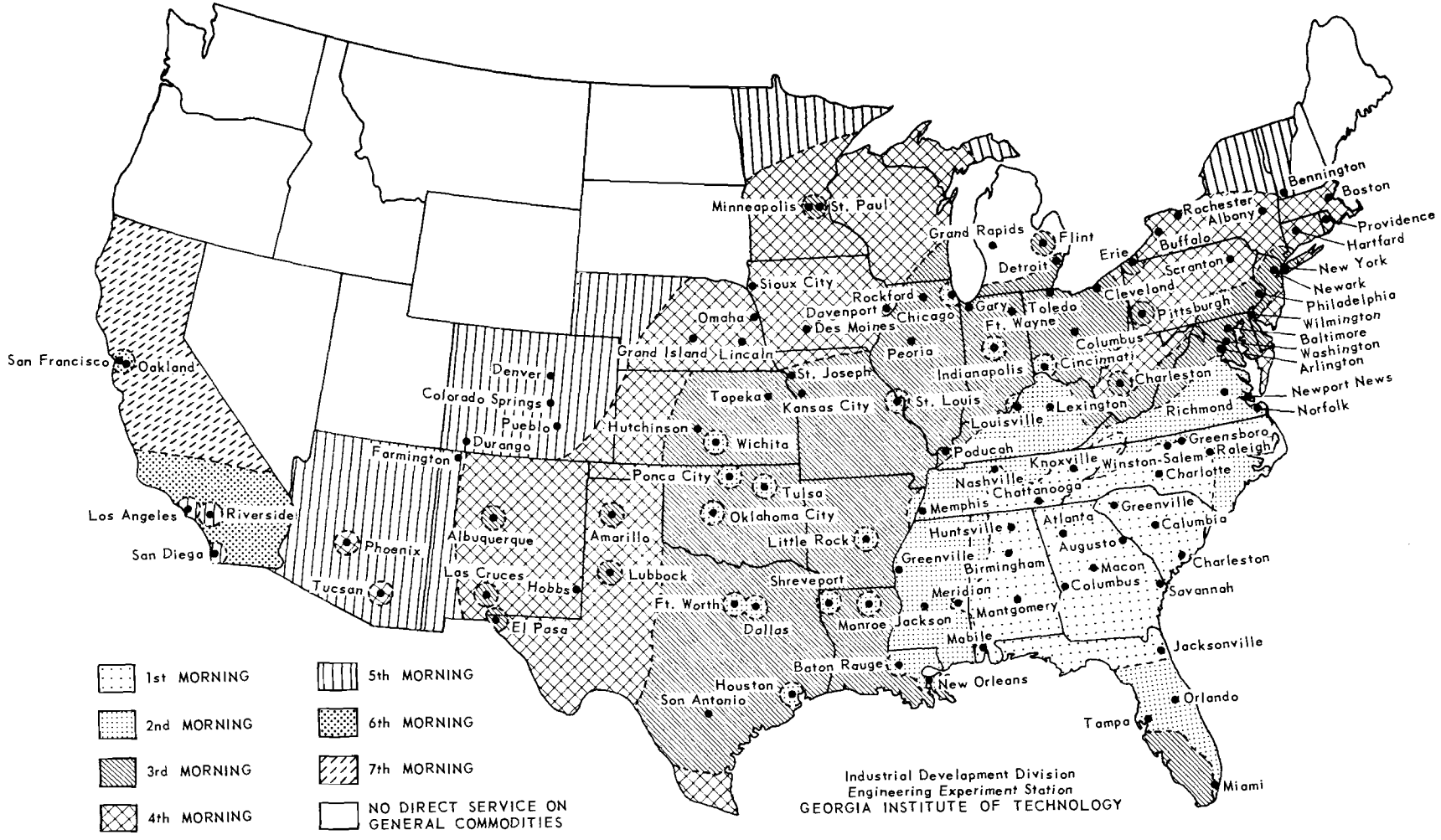


MAP 3
TRANSIT TIMES ON DIRECT TRUCKLOAD SHIPMENTS FROM ATLANTA



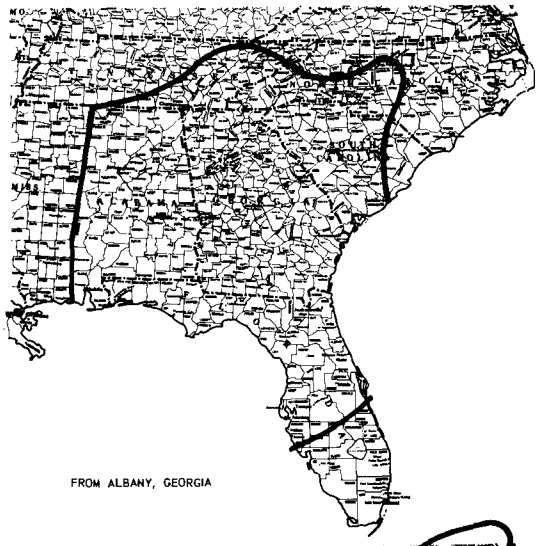
Industrial Development Division
Engineering Experiment Station
GEORGIA INSTITUTE OF TECHNOLOGY

MAP 4
TRANSIT TIMES ON DIRECT LESS-THAN-TRUCKLOAD SHIPMENTS FROM ATLANTA

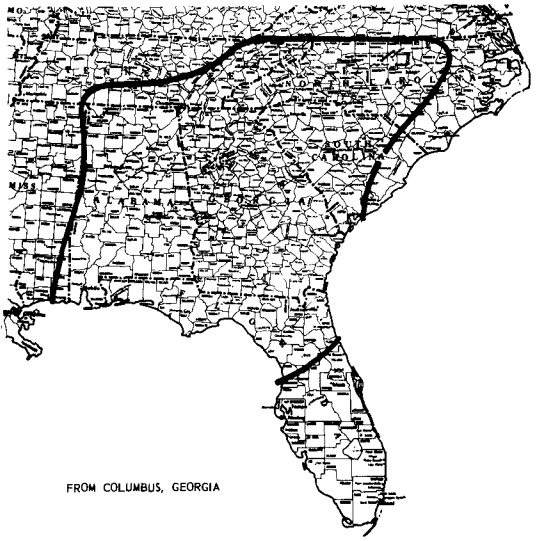


Industrial Development Division
Engineering Experiment Station
GEORGIA INSTITUTE OF TECHNOLOGY

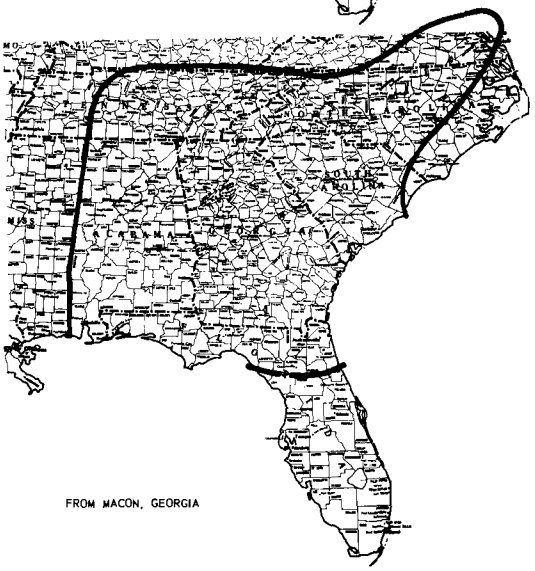
MAP 5
ONE–DAY TRUCKLOAD
SERVICE FROM SIX GEORGIA CITIES



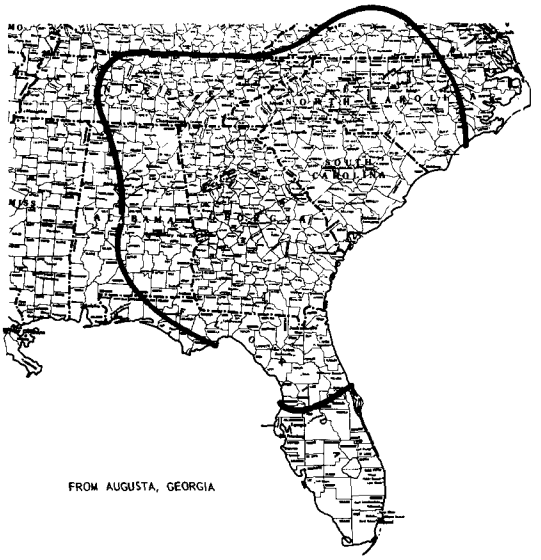
FROM ALBANY, GEORGIA



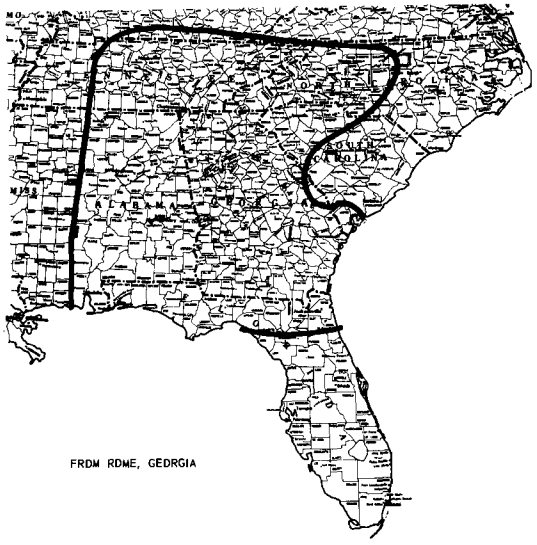
FROM COLUMBUS, GEORGIA



FROM MACON, GEORGIA

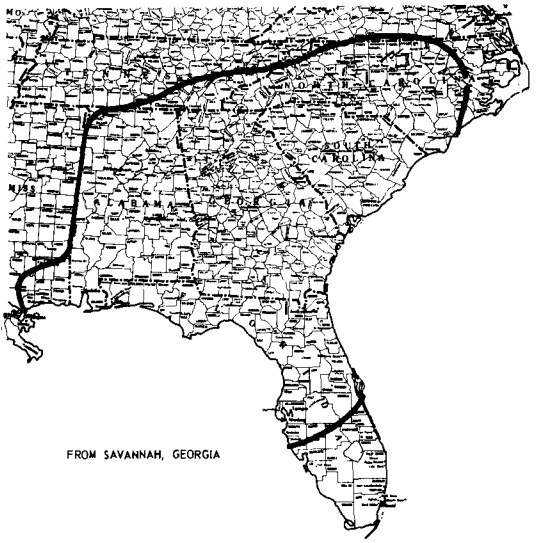


FROM AUGUSTA, GEORGIA



FROM ROME, GEORGIA

Industrial Development Division
Engineering Experiment Station
GEORGIA INSTITUTE OF TECHNOLOGY



FROM SAVANNAH, GEORGIA

-- Chicago, Los Angeles, and New York -- had more emplaning passengers than Atlanta in 1967. Daily single plane flights from Atlanta to cities all over the nation are shown on Map 6.

Three deepwater ports -- Savannah, Brunswick, and St. Marys-Kings Bay -- and the inland port of Augusta, located on a nine-foot channel in the Savannah River, provide access to cities on the Eastern Seaboard via the Atlantic section of the Intracoastal Waterway. Also on nine-foot channels are two other inland ports -- Columbus, on the Chattahoochee River, and Bainbridge, on the Flint River -- which connect via the Gulf section of the Intracoastal Waterway to the mid-continental inland waterway systems. As the Coosa River becomes navigable to Rome, in northwest Georgia, and the further development of the Chattahoochee River takes place, Georgia participation in steel fabricating markets bordering on the Gulf of Mexico should be facilitated.

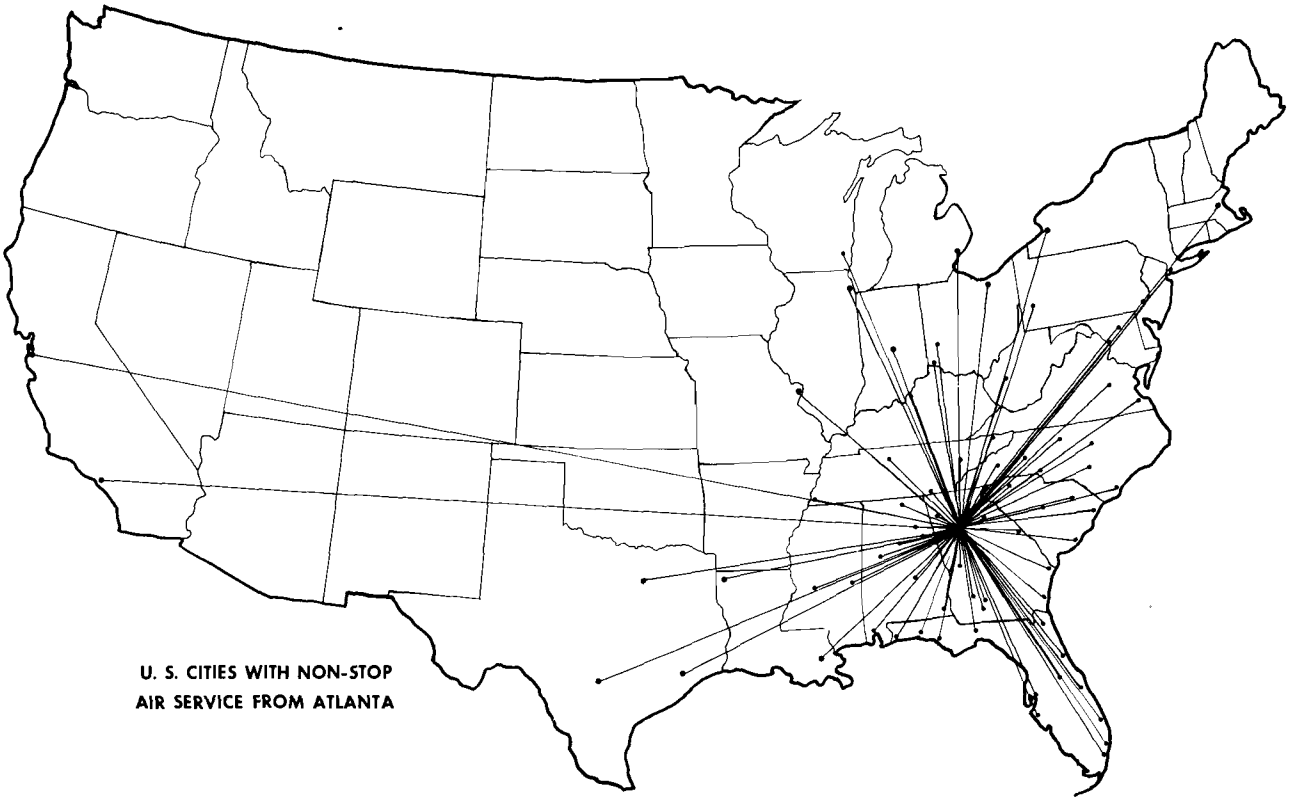
The lower delivery costs possible from a Georgia location may not make it possible for a new Georgia mill to charge slightly higher base prices, however, since pressure from major existing steel producing centers could force the f.o.b price of steel to levels generally charged by the industry; that this is likely to be the case is not certain from a preliminary review. Both the lower freight costs and the speedier delivery would provide enormous indirect benefits to a Georgia steel mill, however. Fabricating firms could be expected to locate and expand Georgia facilities at an even more rapid rate than has been the case in recent years, providing a large and prospering natural market for the new mill.

Labor Costs and Availability

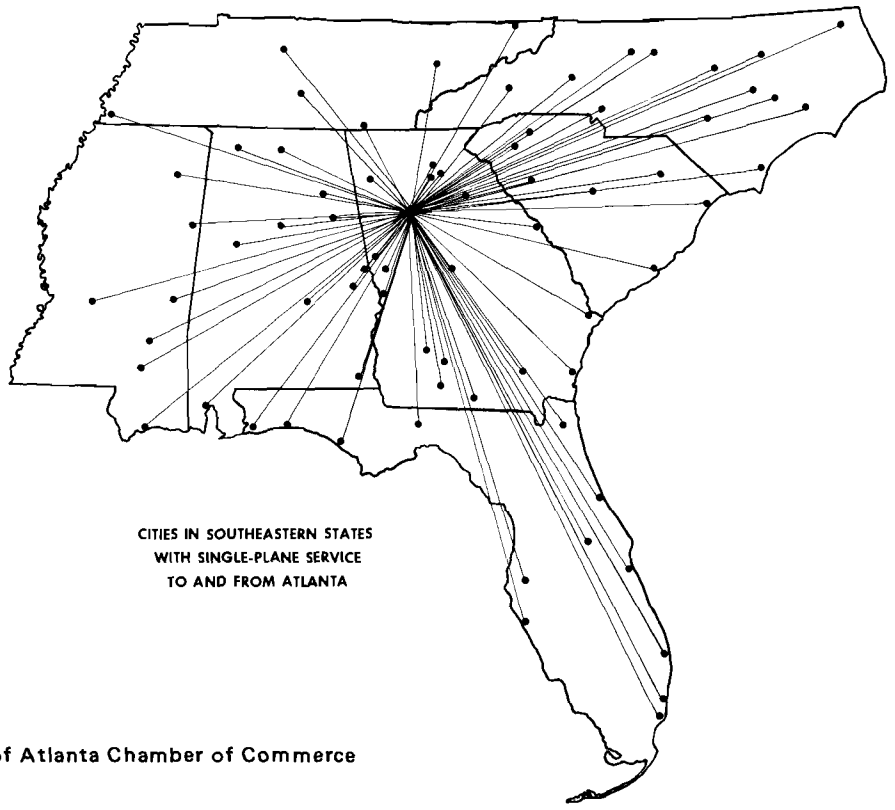
A new mill also could benefit from the potentially lower cost of labor in Georgia compared with current steel centers. This labor cost advantage is based not only on the generally lower wage level in the area, but also on less extensive fringe benefit requirements, more flexible job classification practices, and the potential for higher worker productivity.

Other labor advantages which Georgia has to offer include excellent labor-management relations with little work stoppage, a pool of available workers, and a statewide program of training services. Georgia has long had a record of good labor-management relations. According to past records, the state has a relatively low work stoppage rate, usually well below the national

MAP 6
CITIES WITH NON–STOP AND SINGLE–PLANE SERVICE FROM ATLANTA



U. S. CITIES WITH NON-STOP AIR SERVICE FROM ATLANTA



CITIES IN SOUTHEASTERN STATES WITH SINGLE-PLANE SERVICE TO AND FROM ATLANTA

Maps Courtesy of Atlanta Chamber of Commerce

average.[1/] In addition, an ample supply of trainable labor has been one of the key factors in attracting new industries to Georgia. The extensive training program offered by the network of 22 area vocational-technical schools and two state-operated technical schools is another asset to be considered by potential investors. Besides the regular curricula, special training programs are available for new Georgia industries. These programs include individually designed training plans, provision of facilities and instructors, and assistance in recruiting and selecting labor.[2/]

These same factors will lead to lower total labor costs for steel fabricators as well as steel mills. According to a study made by the Industrial Development Division in 1966, a northern metal fabricating plant employing 250 workers at an annual labor cost of approximately $1.7 million could effect savings ranging from $300,000 to nearly $500,000 if it were located in north Georgia instead.[3/] These savings would result from relatively lower wage level lower fringe benefit costs, and higher worker productivity, with the higher savings figure based on the opinion of many firms in the area that above-averag productivity can be attained even without the use of wage incentives. The less rigid job classification practices of Georgia metalworking firms might give a local plant a further labor cost advantage over northern competitors. Such savings are a significant factor in the current rapid growth of the steel fabricating industry in Georgia and the surrounding states; they and the generally good labor climate will also have a beneficial effect on steel mill labor costs However, a major primary steel plant might have to come under the basic industry agreement with the United Steel Workers in any location in the United States.

Sources of Raw Materials

There are three distinct possibilities for establishing a steelmaking complex in Georgia under present conditions. First, a steel mill with electric

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1/ U. S. Department of Labor, Bureau of Labor Statistics, Analysis of Work Stoppages, 1959-1966.

2/ For details of vocational training assistance, write to Division of Vocational Education, State Department of Education, State Office Building, Atlanta, Ga. 30334.

3/ Light Metal Fabrication in the Coosa Valley by William K. Noland and Martha Ann Deadmore, Industrial Development Division, Engineering Experiment Station, Georgia Institute of Technology, 1966. A comparison of direct and indirect labor rates on different job titles is given in the report.

furnaces and continuous casting facilities could be profitably established in the state. The electric furnace depends solely on scrap as raw material and does not utilize pig iron, coal, and coke in its processing. The supply of scrap has been plentiful in the area, and scrap prices are more depressed in the region than in the nation as a whole. Recent published prices of steel scrap in major U. S. cities are given in Appendix 8. Steel scrap supply and consumption in regions of the United States and in the six southeastern states are given in Appendix 9. Electric power is plentiful in Georgia, and costs are competitive with those in major steel-producing areas. A nuclear power plant scheduled to go into operation on the Altamaha River in southeast Georgia by 1973 should enhance the state's attractiveness to large users of electricity. Continuous casting, as reported previously, would eliminate several steps in forming molten steel into billets, blooms, and slabs, thus reducing steelmaking costs.

The second possibility would be to establish a steelmaking complex at one of the port areas, such as Savannah or Brunswick on the Atlantic Coast, by using imported iron ores. A two-berth, $9.3 million bulk handling terminal is expected to go into operation at the Port of Savannah in early 1971. The integrated system calls for several storage buildings, each nearly one-half mile in length, which will provide compartmented areas for some 30 grades of minerals and ores. However, a steel mill on the coast probably would build its own unloading facilities on site.

Iron ore consumption in the United States, in terms of contained iron, has increased significantly since the end of World War II. At the same time, iron ore production in the U. S. has declined substantially while imports of foreign ores have increased steadily. The main reason is that imported ores give the American iron and steelmaker a more favorable price-quality ratio in the blast furnace than domestic ores, thus bolstering the competitive potential for U. S. steel mill products in world trade as well as in the domestic market. Imported ores constitute about one-third of the domestic consumption at the present time. Major sources of imports are Canada, Venezuela, Liberia, and Chile. In general, prices for South American ores generally would be somewhat cheaper at Savannah than at northern or Great Lakes ports, while the reverse would be true for ores from Africa and Canada. (For some representative iron ore prices at Great Lakes and Atlantic ports and at Mobile on the Gulf Coast, see Appendix 10.)

Coal or coke for use in blast furnaces would have to be shipped in from Alabama or Kentucky. Basic oxygen or electric furnaces could be used for steelmaking. The supply of oxygen and gas fuel in Georgia, according to a major supplier in the area, is competitive with that anywhere else in the Southeast. In addition, a 40,000-barrel-a-day oil refinery is being planned at Brunswick, Georgia, and attempts are under way to liberalize federal government policies to permit building of a 200,000-barrel-a-day refinery at Savannah, Georgia. If these projects materialize, they will add greatly to the fuel economy in the state and area.

A third possibility, which cannot be evaluated at this time, is to establish a steel mill along the Chattahoochee River in southwest Georgia based on the local supply of high-grade iron ores. Counties in this region from which brown ores are being mined or have been extracted in recent years include Dooly, Marion, Quitman, Stewart, and Webster. Iron content ranges up to 58%. Tonnage cannot be determined because the Clayton formation surmounts most of these iron beds. It also is probable that considerable tonnages of ore are present in nearby areas.

In the early 1960's, a steel mill was projected for location in Quitman County, near Georgetown, to utilize Georgia and Alabama brown iron ores, but the project eventually lapsed. However, it seems to have sufficient merit to warrant renewed efforts to make this type of development a reality. At least, the project deserves critical review to determine its current status and feasibility. After investigation, should the ore reserves in the area prove inadequate to support the projected mill over its anticipated operating life or the ore-collection costs prove excessive, imported iron ores could be barged from the Gulf Coast up the Chattahoochee River (see page 62) to provide a supplementary supply.[1/]

In addition to the southwest Georgia counties mentioned above, which produce nearly all of the mined output in Georgia, iron ores are present in two areas in northwest Georgia. Low-quality brown ores are found in the Cartersville-Cedartown area. Tonnage is not known, and mining activity recently

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1/ George I. Whitlatch, "Mineral Resources," Economic Development Possibilities in the Chattahoochee River Basin, Part I: Georgia, Industrial Development Division, Engineering Experiment Station, Georgia Institute of Technology, 1967.

ceased there. Beneficiation processes can be adopted to enrich the ores in these two areas when the demand for domestic iron ore makes such a step economically justifiable. The other area is the extreme northwest corner of the state, where low-grade red ores, known as Clinton hematite or "fossil iron," are found mainly in Dade, Catoosa, Whitfield, and Chattooga counties. The tonnage is known and properly mapped, but no ores are being mined at present.[1/]

Iron ore has been mined in Georgia since about 1840. Current production is very small, amounting to approximately 500,000 long tons of usable brown iron ores annually. Slightly more than a dozen small mining companies operate in Georgia. Mined ores are sent to the iron and steel plants in Alabama. Several attempts have been made to utilize local iron ores for the production of iron and steel in the state, but no concrete results have been realized.[2/] Bituminous coal formerly was mined in extreme northwest Georgia, but there is no production now.

The Growing Economic Base of Georgia and Bordering States

Georgia also would offer steel producers a climate of general economic well-being and rapid growth in which to operate. Analysis of a variety of economic indicators shows that Georgia and the five contiguous states which make up Georgia's natural market area[3/] are growing more rapidly than is the United States as a whole. This burgeoning economic base is creating strong pressures for the establishment of additional steelmaking facilities in the state.

A comparison of Georgia's growth between 1950 and 1966 in population, employment, income, trade, investment, utility capacity, and new vehicle registrations with that of the United States reveals that Georgia's proportion of the U. S. totals has been increasing in all but two areas; in the case of population and installed electric utility capacity, Georgia has approximately kept pace

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1/ For detailed information on Georgia iron ores see Georgia's Mineral Resources by George I. Whitlatch, Industrial Development Division, Engineering Experiment Station, Georgia Institute of Technology, 1962, and Georgia Mineral Newsletter, Vol. X, No. 3, Vol. XII, No. 2, and Vol. XIV, No. 4, Georgia Department of Mines, Mining and Geology, State Agricultural Building, Atlanta, Ga.

2/ A study of the feasibility of producing 100,000 tons of pig iron at Georgetown, Ga., was conducted by Koppers Company, Inc., Pittsburgh, Pa., and by Strategic-Udy Processes, Inc., Niagara Falls, N. Y., in 1962. The study finding was affirmative.

3/ Alabama, Florida, North Carolina, South Carolina, and Tennessee.

with the nation. In the six-state area as a whole, the gains have exceeded those of the nation in every case. Table 29 puts Georgia's economic growth in perspective with that of the six-state Southeast and the U. S. Detailed comparisons of Georgia's performance in each economic category with the record of its neighboring states and the U. S. are provided in Appendix Tables 11-A through 11-M.

Georgia's population increased from 3,445,000 in 1950 to 4,445,000 in 1966, changing from 2.29% of the U. S. total to 2.27%. During the same period the six southeastern states rose from 12.4% of the U. S. to 12.9%. Based on projections by the U. S. Bureau of the Census, the population of the six-state area may be expected to reach 13.3% of the U. S. by 1980.

In registration of new vehicles, Georgia's percentage of the nation exceeded its share of national population in 1966, accounting for 3.65% of automobiles registered in the U. S. in that year and 2.85% of the trucks. The six-state area's proportion of U. S. truck registrations exceeded its share of U. S. population in both 1959 and 1966. Automobile registrations increased over four times as rapidly between 1959 and 1966 in Georgia as they did in the U. S., and the growth in truck registrations was 60% greater. Since the automobile constitutes one of the major outlays for the average American family's budget, it is a significant measure of the economic activity of a given area. Similarly, truck purchases are an indication of the trade and manufacturing activities of an area.

Georgia's rate of growth in manufacturing employment was nearly twice tha of the nation in the 1950-1966 period, registering a 49% increase as opposed to a 25% gain in the U. S. The six-state area as a whole recorded a 60% jump during the same period.

Growth in construction employment, when compared with the U. S. gain, was nearly as spectacular in both Georgia and the six-state area as the manufactur ing employment gains. In fact, the area registered such a large increase in construction employment over the 16-year period that the ratio of construction employment (14.2% of the U. S. in 1966) currently is larger than the populatio ratio of the area (12.9%).

Economic sectors in which Georgia's percentage gains were approximately o and one-half times those of the nation as a whole include nonagricultural

Table 29

ECONOMIC GROWTH OF GEORGIA AND BORDERING STATES, 1950-1966

Economic Indicator	Georgia 1950	Georgia 1966	Six-State Southeast[a] 1950	Six-State Southeast[a] 1966	Georgia % of Six States 1966	Six-State % of U. S. 1966
Population (000)	3,445	4,445	18,749	25,278	17.6	12.9
Nonagricultural employment (000)	806.6	1,322.8	4,279.1	7,394.7	17.9	11.6
Manufacturing employment (000)	286.5	426.8	1,483.5	2,371.5	18.0	12.4
Construction employment (000)	40.3	70.9	253.8	465.2	15.2	14.2
Total personal income (million $)	3,574	10,579	19,264	58,485	18.0	10.1
Per capita personal income ($)	1,034	2,379	1,020	2,269	104.8	76.6
Total long-term savings of individuals (million $)	1,494	6,615	7,878	38,802	17.0	8.3
Wholesale sales (million $)	4,548 [b]	8,100 [c]	20,366 [b]	34,635 [c]	23.4[c]	9.7[c]
Retail sales (million $)	2,311	5,911	12,960	34,397	17.2	11.4
Value added by manufacture (million $)	1,236	4,061 [d]	6,620	22,213 [d]	18.3[d]	9.9[d]
New plant investment (million $)	115 [e]	307 [d]	699 [e]	2,165 [d]	14.2[d]	13.1[d]
Installed capacity of electric utilities (000 kw)	1,156	4,158	8,122	40,251	10.3	16.2
New vehicle registrations (auto)	105,747 [f]	329,216	657,036 [f]	1,088,216	30.3	12.1
New vehicle registrations (truck)	21,058 [f]	45,905	124,508 [f]	215,194	21.3	13.4

a/ Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee.

b/ 1954. c/ 1963. d/ 1965. e/ 1951. f/ 1959.

Sources: See Appendix Tables 11-A through 11-M.

employment (64% versus 41%), wholesale sales (78% versus 52%), value added by manufacture (229% versus 151%), and investment in new manufacturing plant and equipment (167% versus 113%). Georgia's growth in wholesale sales also exceeded the record of the six-state area.

On the other hand, the area's 210% increase in new plant expenditures wa particularly outstanding in relation to Georgia and the U. S., and the area's proportion of U. S. plant investment in 1965 (13.1%) was larger than its shar of U. S. population. The ratio of installed capacity of electric utilities i the six states in 1966 (16.2%) also exceeded its population ratio.

That Georgia plays an important role in the economic growth of the six-state area is demonstrated by the fact that the state's share of the area total exceeds its population percentage in seven of the economic indicators listed in Table 29: nonagricultural and manufacturing employment, total personal income, wholesale sales, value added by manufacture, and new automobile and truck registrations. Between 1950 and 1966, Georgia grew faster than the area as a whole in per capita personal income, wholesale sales,[1/] and new vehicle registrations.[2/] Although both Georgia and the area increased their proportions of the national average per capita personal income over the 16-year period, Georgia's per capita income exceeded the six-state average at both the beginning and the end of the period. In 1966, Georgia's per capita income was 80.3% of the U. S. and was second only to Florida among the six states.

In several other sectors Georgia ranks at or near the top among the six southeastern states. The state recorded the most new automobile and truck re; istrations in 1966 and showed the largest percentage gains in both categories between 1959 and 1966. It had the largest dollar gain in per capita income f: 1950 to 1966. Georgia also led the Southeast in volume of wholesale sales in 1963, and its percentage increase over the 1954 total was second only to Flor: In five other sectors, the state's 1966 proportion of the U. S. total was exceeded only by Florida and North Carolina and its percentage gain over the 16-year period was second to Florida; these sectors are population,

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1/ 1954-1963.

2/ 1959-1966.

nonagricultural employment, total personal income, total long-term savings of individuals, and retail sales.

Georgia's relative standing among its neighboring states is extremely favorable in two-thirds of the economic indicators discussed above. Its strongest challenger is Florida, which, however, has the disadvantage of a peninsular location that would make it more difficult to serve the six-state natural market area. So Georgia appears to be a logical location for additional steelmaking and steel fabricating facilities to meet the demands of the expanding southeastern economy.

STEEL FABRICATING OPPORTUNITIES FOR GEORGIA

Based on information obtained through interviews and through screening and tabulation processes for this study, 29 steel fabricating industries have been selected as having potential for new investment in Georgia. The list includes steel using or steel fabricating industries classified either as five-digit industries or as four-digit industries under the U. S. Department of Commerce's Standard Industrial Classification (SIC). The list is by no means exhaustive in nature.

In this chapter, some initial information is offered on these industries. Maps are used extensively to indicate where major producers are located. In most instances, the maps vividly illustrate the need for such industries in the six-state area.[1/] However, determination of the actual feasibility of establishing new manufacturing facilities in the area would require in-depth studies of each industry.

Commercial Forgings

Forging is the forming or shaping of metals and alloys to improve their mechanical properties through controlled deformation under impact or pressure. Establishments engage in manufacturing iron and steel forgings with or without the use of dies. These establishments generally operate on a job or order basis, manufacturing forgings for sale to others. Forgings are used by the automotive, aircraft, transportation, ordnance, plumbing and oil field equipment, and tool and hardware industries, as well as many others.

The metal forging business has grown consistently with the expansion of all metal fabricating industries. Shipments of commercial steel forgings in 1966 amounted to 2,104,000 short tons valued at $1,224 million, consisting of 1,311,000 short tons of carbon steel forgings valued at $545 million and 793,000 short tons of alloy steel forgings valued at $679 million.[2/] In 1963 the value of shipments in the United States for iron and steel forgings was

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1/ Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee.

2/ U. S. Department of Commerce, Current Industrial Reports, MA-33C(66)-1, December 1967.

reported at $868,948,000.[1/] In contrast, the six-state Southeast accounted for only an estimated $4 million in that year and $7 million in 1967. However, this does not mean that the forging market in the Southeast is small. On the contrary, the forging requirements of southeastern industries have to be met largely in the North and shipped to the Southeast.

The need for additional forging facilities in the six-state area has drawn widespread attention. Preliminary data and survey results from an unpublished study conducted by the Industrial Development Division in 1967 indicate that the merchant market for iron and steel forgings amounted to $20 million in 1963 (five times the area's output) and over $25 million in 1967. The demand is projected to grow at twice the national rate, or 8% a year. A steel producer in the area recently made a similar study. Although the details of the latter study are not available, the conclusion of their study is unmistakably optimistic.

Closed die forgings (SIC 33911) constitute about 74% of all forging shipments. The producers of closed die forgings are shown on Maps 7 and 8. Producers with forgings as their primary products are located on Map 7, and those with forgings as secondary products are given on Map 8. The concentration of these producers, both primary and secondary, in the northern states is obvious.

Ball and Roller Bearings

This industry comprises establishments primarily engaged in manufacturing ball and roller bearings and parts (SIC 35621, 35622, and 35624). Antifriction ball and roller bearings are essential components of practically all machinery and equipment used in industrial, commercial, or defense items. Manufacturers' shipments of antifriction ball and roller bearings increased from $501 million in 1950 to an estimated $1,173 million in 1967 and $1,255 million in 1968.[2/] The trend of the industry is toward higher precision and more specialized production.

The antifriction bearing industry has approximately 70 companies which are primary producers. Most of the production facilities are concentrated in the

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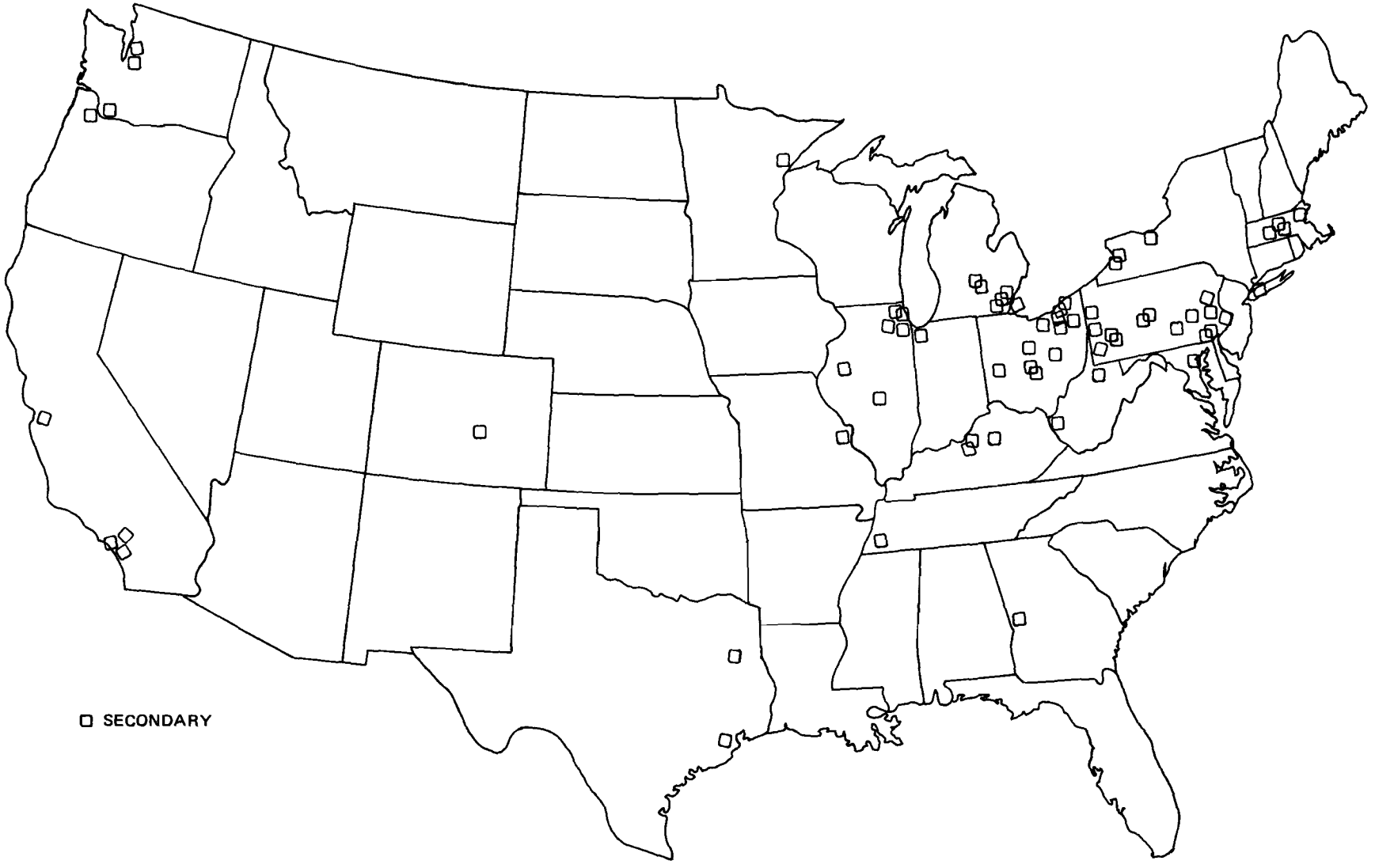
1/ U. S. Bureau of the Census, Census of Manufactures, 1963, Industry Statistics, Part 2, 33E-7.

2/ U. S. Department of Commerce, U. S. Industrial Outlook for 1968.

MAP 7
LOCATIONS OF PLANTS IN THE UNITED STATES WITH CLOSED DIE FORGINGS AS THEIR PRIMARY PRODUCT, 1966

MAP 8
LOCATIONS OF PLANTS IN THE UNITED STATES WITH CLOSED DIE FORGINGS AS A SECONDARY PRODUCT, 1966



Northeast and Midwest. Locations of these companies are given on Maps 9, 10, and 11.

Shipments of ball and roller bearings originating in the South constituted only 2.4% of the national value of shipments in 1963 -- $23,481,000 out of $998,784,000. Because of the rapid industrialization of the South since the end of World War II, the need for bearing production in the region is obvious. Major bearing companies maintain sales offices in Atlanta. Although data on the market for bearings in the six-state area are not available, it is believed sizable.

Production of bearings in the six-state area has increased from one plant with 80 employees in 1957 to three plants with 1,075 workers in 1967. However, the employment in the area constitutes only 1.8% of total employment in the ball and roller bearing industry in the United States. Additional expansion of production in the area is anticipated.

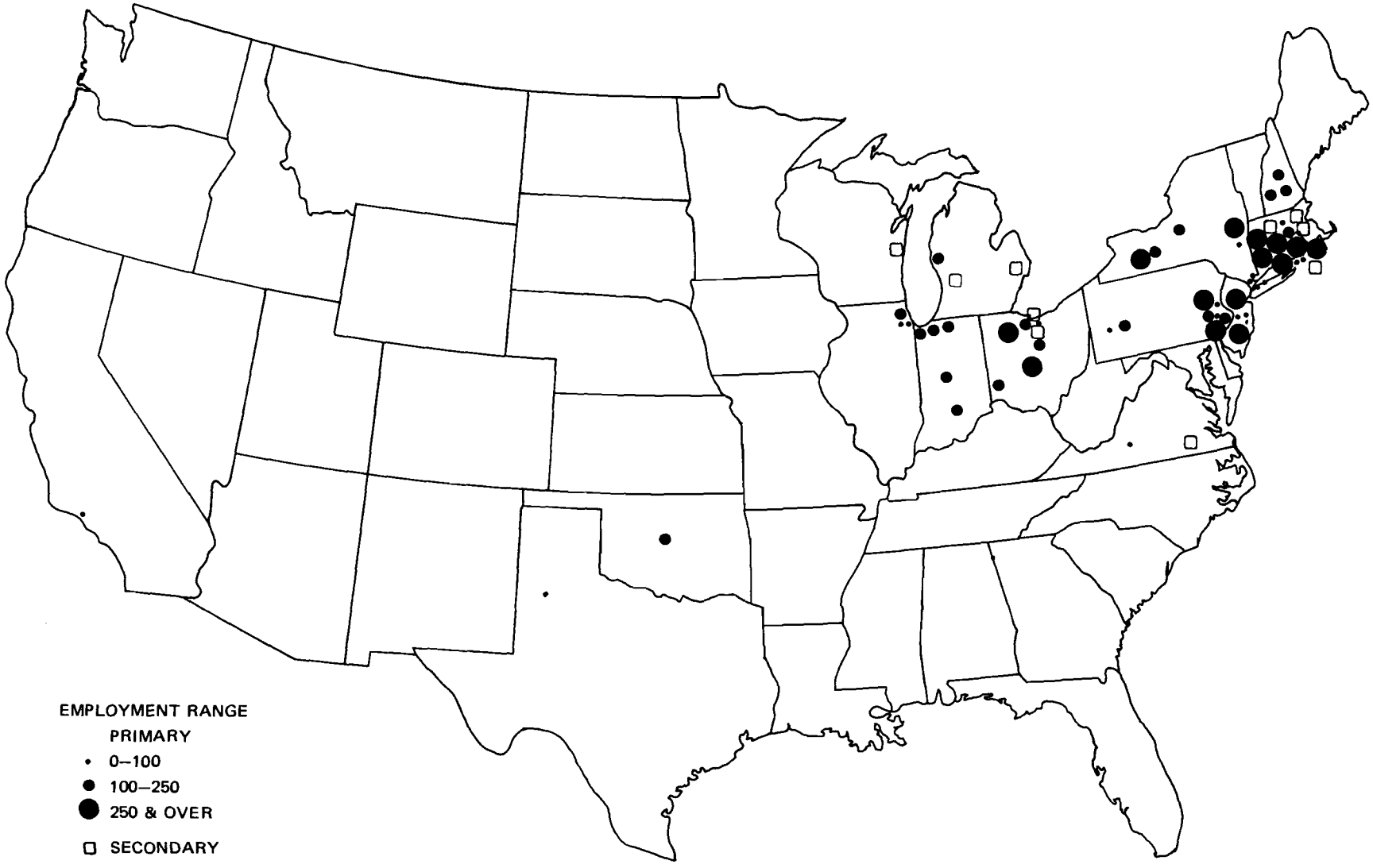
Household Appliances

Household appliances include cooking equipment (SIC 36311), refrigerators (SIC 36321), freezers (SIC 36322), laundry equipment (SIC 36331), electric housewares and fans (SIC 36341), vacuum cleaners (SIC 36350), sewing machines (SIC 36360), and household appliances not elsewhere classified (SIC 36393). Cold-rolled steels continue to be the major material used by the industry. Despite inroads made by other materials, principally plastics, use of steel by appliance producers in the United States has risen from 1.4 million tons in 1961 to a current annual usage of 1.8 million tons a year.

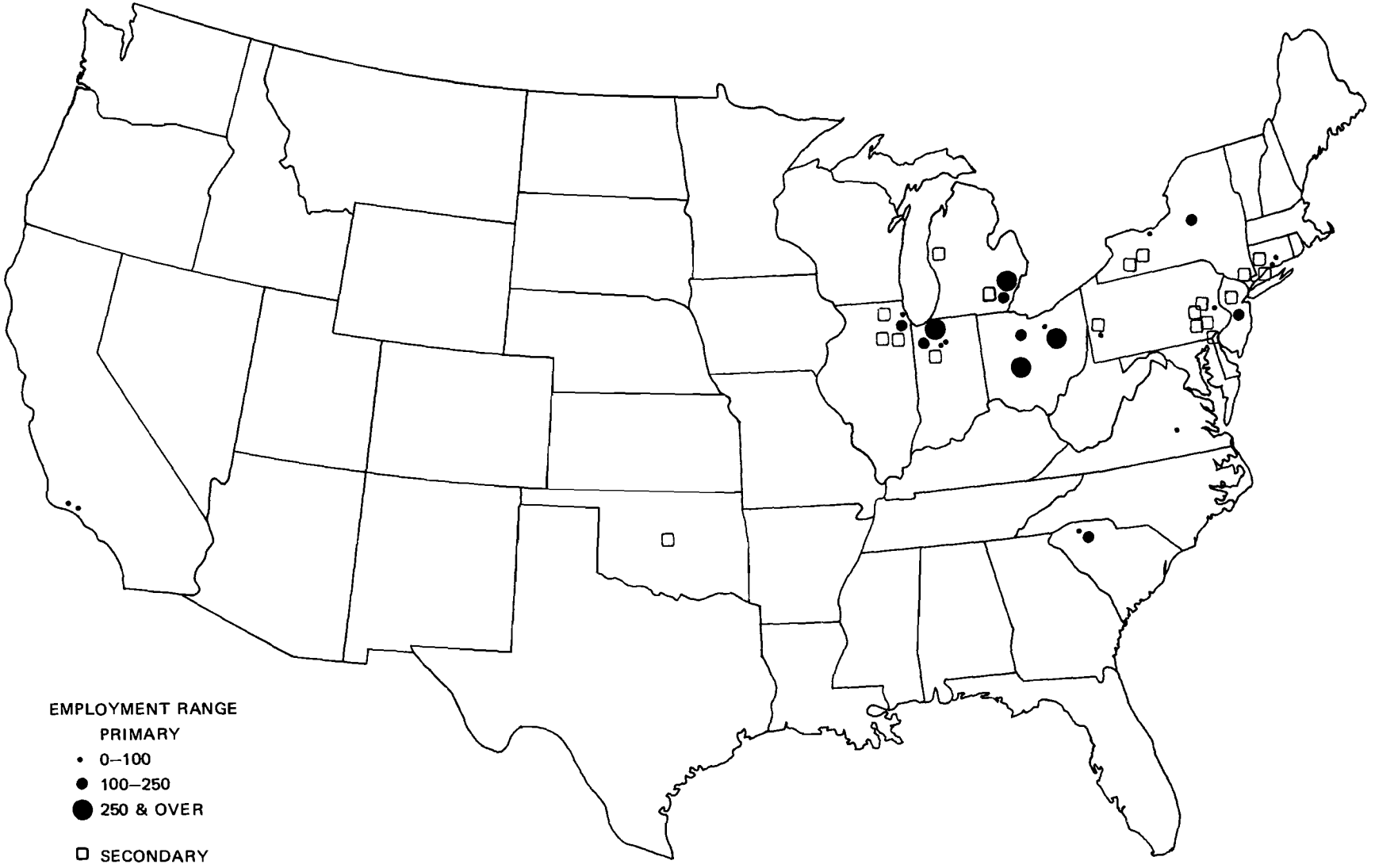
Shipments of household appliances by appliance producers from 1958 to 1967 are given in Table 30. The household appliance industry as a whole increased its value of shipments 59% in the last decade. Household refrigerators constituted about one-third of the total shipments, while housewares and fans registered the largest growth, a 106% increase between 1958 and 1967.

The market for household appliances in a given area can be estimated reasonably well by the distribution of population and the personal income level of the area. On this basis, the six-state area should consume about 10% to 13% of the total shipments of household appliances in the nation. However, the production of household appliances in the area falls far below this range, and the relative importance of the kinds of items produced varies widely. The area

MAP 9
LOCATIONS OF PRODUCERS OF COMPLETE BALL BEARINGS IN THE UNITED STATES, 1966



MAP 10
LOCATIONS OF PRODUCERS OF COMPLETE ROLLER BEARINGS IN THE UNITED STATES, 1966



MAP 11
LOCATIONS OF PRODUCERS OF PARTS AND COMPONENTS
FOR BALL AND ROLLER BEARINGS IN THE UNITED STATES, 1966

Table 30

VALUE OF SHIPMENTS OF HOUSEHOLD APPLIANCES IN THE UNITED STATES, 1958-1967
(in millions of dollars)

Item	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	Percent Increase 1958-1967	% of Total 1967
Household cooking equipment	365	411	407	401	413	473	500	554	548	526	44	10.4
Household refrigerators	1,002	1,199	1,157	1,102	1,205	1,305	1,455	1,594	1,675	1,709	71	33.7
Household laundry equipment	739	836	723	715	756	763	832	889	947	965	31	19.0
Housewares and fans	559	596	629	671	741	851	889	980	1,128	1,151	106	22.7
Household vacuum cleaners	142	154	154	151	164	175	185	211	253	258	82	5.1
Household appliances, n.e.c.	379	399	348	353	413	431	467	476	449	458	21	9.1
Total	3,186	3,595	3,418	3,393	3,692	3,998	4,328	4,704	5,000	5,067	59	100.0

Source: U. S. Department of Commerce, U. S. Industrial Outlook for 1968.

contains no manufacturers with refrigerators, freezers, laundry equipment, or vacuum cleaners as their primary product. On the other hand, there are a few sizable producers of cooking equipment, electric housewares and fans, sewing machines, and household appliances not elsewhere classified in the area. The distribution of most of these kinds of appliance producers in the United States is shown on Maps 12 through 18.

The household appliance industry will be one of the major growth areas in the next decade. The usage of steel in appliances and other domestic and commercial equipment is projected at over 10 million net tons by 1980 compared with the actual usage of 4.4 million net tons in 1968. (See Table 6.) But no major household appliance producer of any kind is located in Georgia. There are only three very small plants engaged in the manufacture of cooking equipment and miscellaneous items in the state. The development of this major industry in Georgia should be given serious attention.

Metal Office Furniture

Metal office furniture (SIC 2522) includes chairs, stools, sofas, couches, settees, desks, cabinets and cases, tables and stands, modular service units, and other items. Shipments of metal office furniture increased from $256 million in 1955 to $533 million in 1966, a 108% increase in the 11-year period. The distribution of the value of shipments in 1966 is given in Table 31.

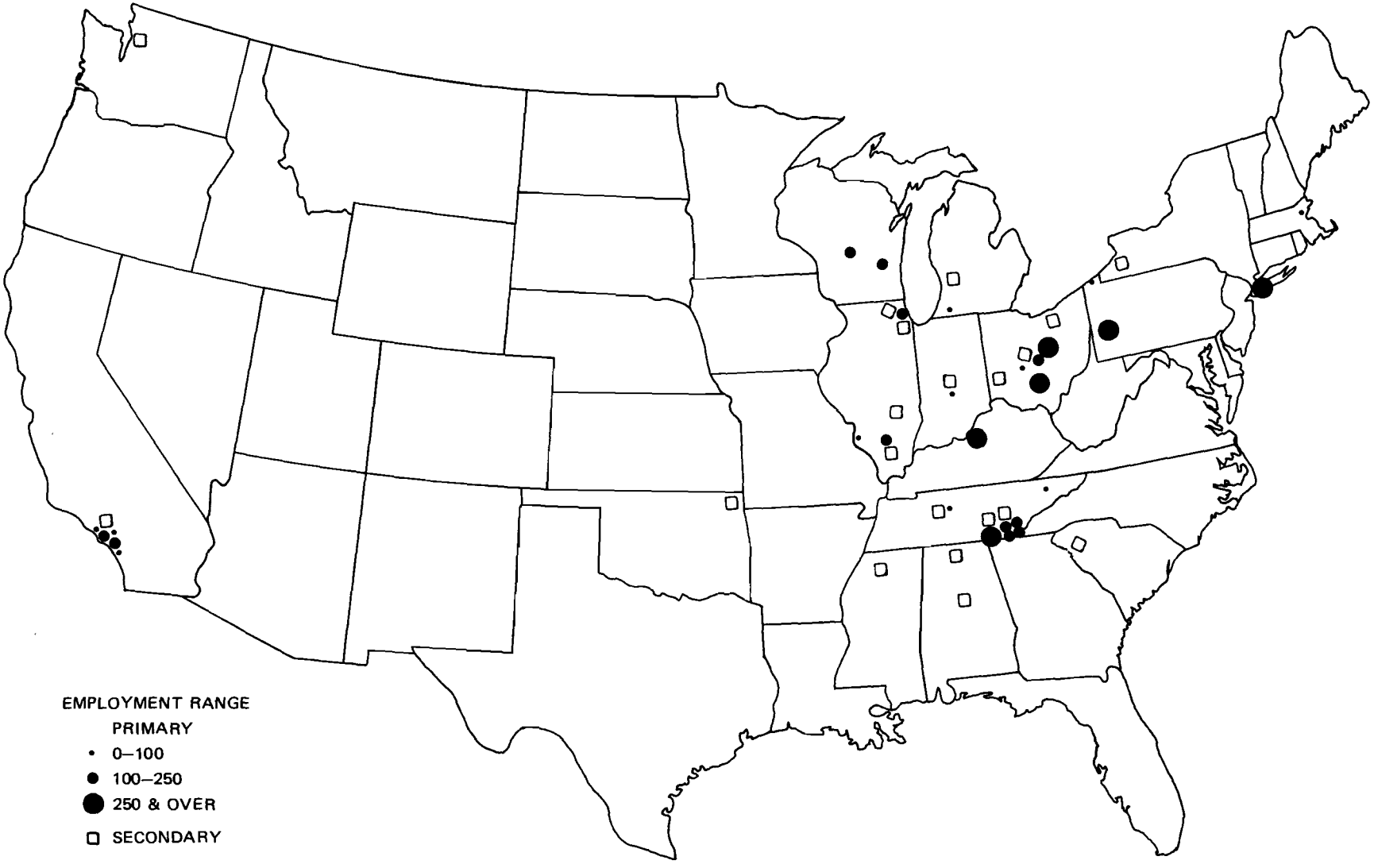
Table 31

MANUFACTURERS' SHIPMENTS OF METAL OFFICE FURNITURE IN THE UNITED STATES, 1966

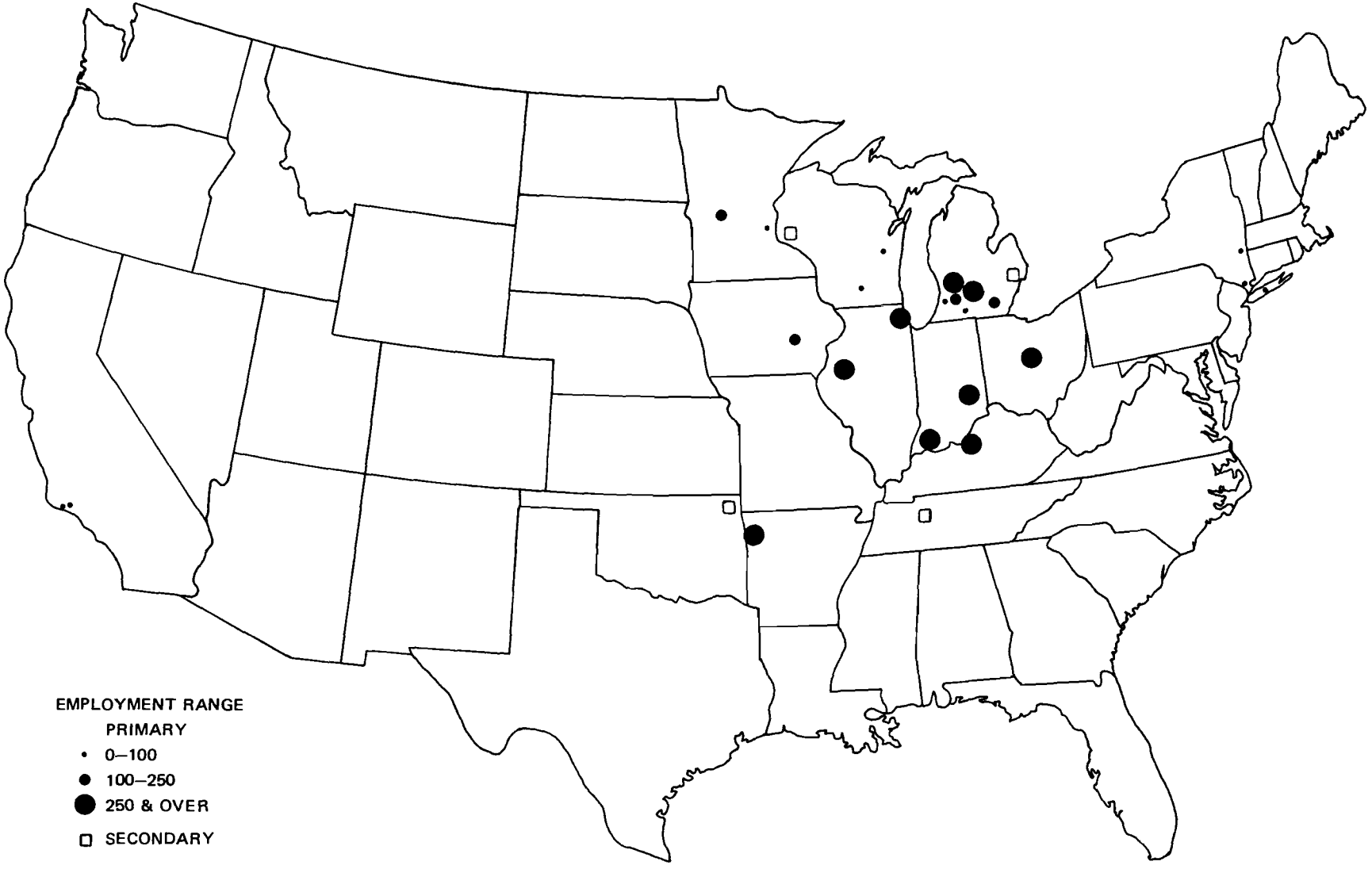
Items	Manufacturers' Shipments	Percent
Chairs, stools, sofas, couches, settees, etc.	$117,782,000	22.1
Desks	151,551,000	28.4
Cabinets and cases	188,892,000	35.4
Other metal office furniture	75,185,000	14.1
Total	$533,410,000	100.0

Source: U. S. Department of Commerce, Current Industrial Reports, MA-25H(66)-1.

MAP 12
LOCATIONS OF PRODUCERS OF ELECTRIC HOUSEHOLD RANGES AND OVENS IN THE UNITED STATES, 1966



MAP 13
LOCATIONS OF PRODUCERS OF HOUSEHOLD REFRIGERATORS IN THE UNITED STATES, 1966



MAP 14
LOCATIONS OF PRODUCERS OF HOME AND FARM FREEZERS IN THE UNITED STATES, 1966

MAP 15
LOCATIONS OF PRODUCERS OF HOUSEHOLD WASHING MACHINES, DRYERS, AND WASHER–DRYER COMBINATIONS IN THE UNITED STATES, 1966

MAP 16
LOCATIONS OF PRODUCERS OF HOUSEHOLD VACUUM CLEANERS IN THE UNITED STATES, 1966

MAP 17
LOCATIONS OF PRODUCERS OF SEWING MACHINES AND PARTS IN THE UNITED STATES, 1966

MAP 18
LDCATIDNS DF PRDDUCERS OF HOUSEHOLD APPLIANCES,
NOT ELSEWHERE CLASSIFIED, IN THE UNITED STATES, 1966

About seven plants with a total employment of 1,420 persons are engaged in metal furniture manufacture in the six-state area. Their employment constitutes only 4.6% of the national total in this field. It is reported that no major producer of metal office desks exists in the entire area, although annual shipments of steel office desks into the area are sizable. Apparently, there is room in the six-state area for the expansion of the metal furniture manufacturing industry. The distribution of metal furniture manufacturing in the nation is shown on Map 19.

Selected Fabricated Metal Products

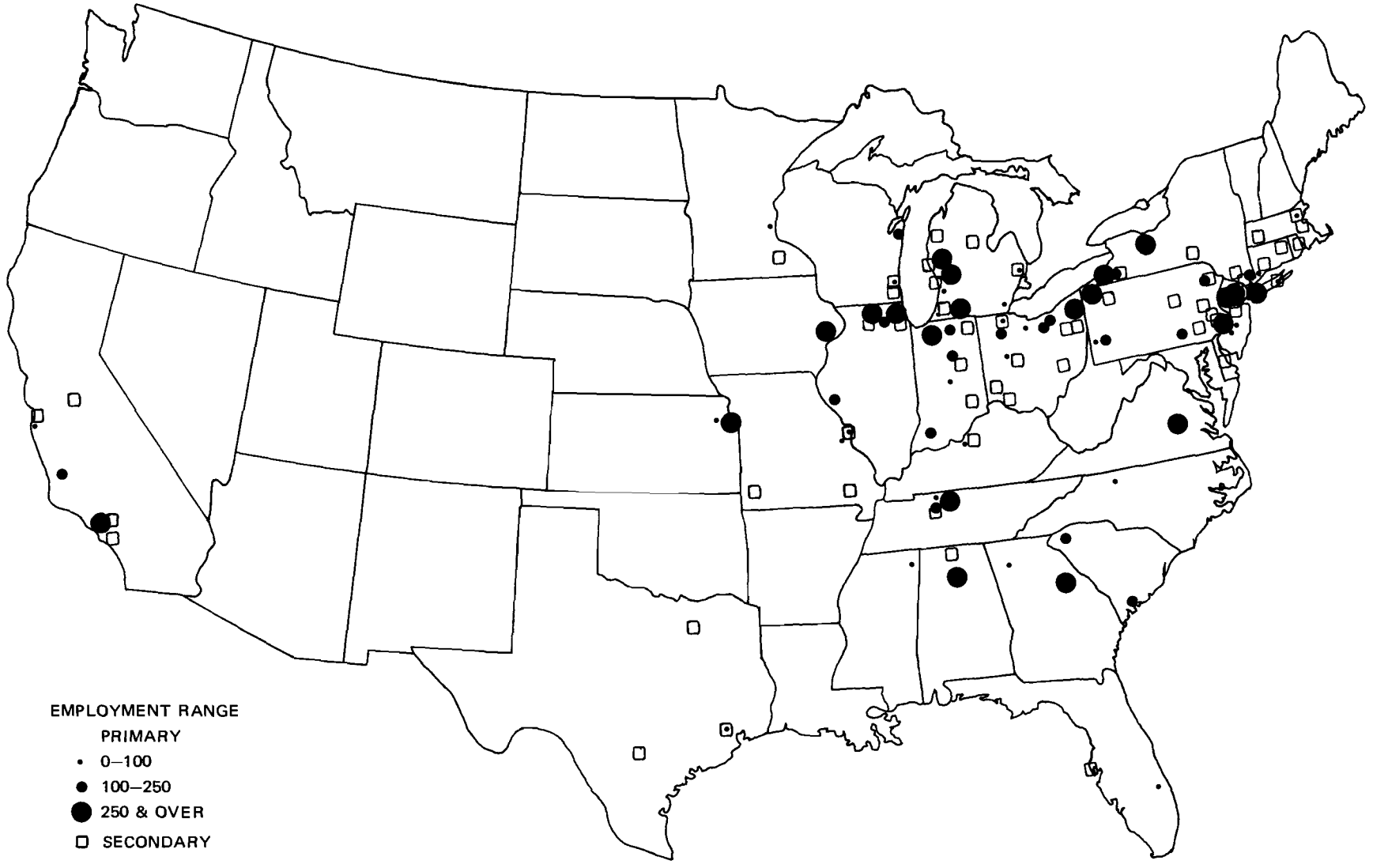
Four fabricated metal product groups have been selected for discussion: (1) bolts, nuts, screws, rivets, and washers (SIC 3452); (2) metal stampings (SIC 3461); (3) electroplating for the trade (SIC 3471); and (4) galvanizing, coating, and engraving (SIC 3479).

About 375 plants with a total employment of 68,951 persons were engaged in the production of bolts, nuts, screws, rivets, and washers in the United States in 1967. In the six-state area, 13 plants with an employment of 2,130 persons were engaged in manufacturing these items in that year. The area's employment is only 3.1% of the national total, and of the 13 plants in the area, only one has an employment of over 250 persons. The distribution of U. S. producers and their sizes are presented on Map 20.

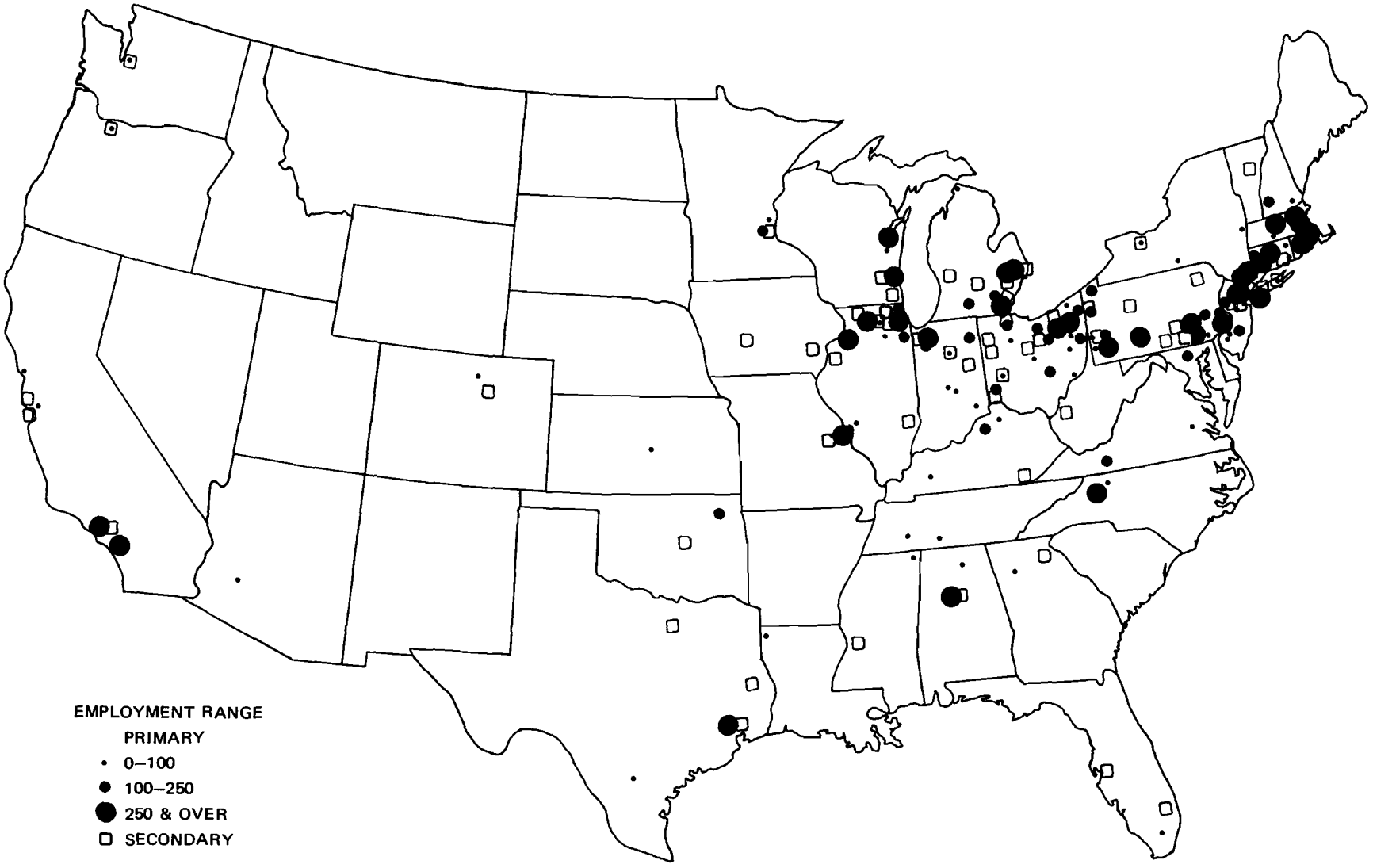
The industry has been growing steadily in the past two decades because of the broad-based utilization of its products. In 1963, the value of shipments reached $1,218 million in the nation; however, the shipments which originated in the South Atlantic Region were only $34.8 million, or 2.9% of the national total. Interest in expanding production in the area has been expressed by several steel-related concerns.

The metal stamping industry produces job stampings and finished end products. Job stampings are made from materials owned by the stamping establishments as well as from materials owned by the customer and processed by the stamping establishments on a contract or commission basis. These stampings are mainly parts which are sold to manufacturers for incorporation into any of a wide variety of products such as refrigerators, agricultural machinery, and radio and television sets. Finished end products manufactured by establishments

MAP 19
LOCATIONS OF METAL OFFICE FURNITURE PRODUCERS IN THE UNITED STATES, 1967



MAP 20
LOCATIONS OF PRODUCERS OF BOLTS, NUTS, SCREWS, RIVETS, AND WASHERS IN THE UNITED STATES, 1967



in this industry include cooking, kitchen, and hospital utensils, pails, and ash cans, as well as a large variety of miscellaneous items.

As in the case of the bolts and nuts industry, the value of shipments for the metal stamping industry has increased steadily, rising from $1,841 million in 1954 to $2,679 million in 1963 -- a 46% increase in the nine-year period. The composition of stamping products shipped in 1963 is given in Table 32. Job stamping and automotive stamping constituted about two-thirds of the total shipments, and the remaining one-third was distributed among the other seven items.

Table 32

SHIPMENTS OF METAL STAMPING PRODUCTS IN THE UNITED STATES, 1963

Items	Manufacturers' Shipments	Percent
Vitreous-enameled products	$ 70,144,000	2.8
Job stamping, except automotive	756,745,000	30.5
Automotive job stampings	848,076,000	34.1
Stamped and spun utensils, aluminum	95,667,000	3.8
Stamped and spun utensils, except aluminum	134,321,000	5.4
Metal commercial closures, except crowns	147,943,000	6.0
Metal crowns for glass and metal containers	81,977,000	3.3
Other stamped and pressed metal products	250,679,000	10.1
Metal stampings, n.e.c.	98,114,000	4.0
Total	$2,483,666,000	100.0

Source: U. S. Bureau of the Census, Census of Manufactures, 1963.

Shipments in the six-state area of the metal stampings listed above totaled $56 million in 1963, or 2.3% of the national shipments. Georgia shipped $39 million of the area total in that year. There are about 1,156 establishments with 218,733 persons employed in metal stamping activities in the nation, but in the six-state area, only 25 plants with 3,787 persons were reported in 1967. In terms of employment, the area constitutes only 1.7% of the national

total, indicating that additional stamping facilities are needed. Locations of metal stamping producers in the United States are given on Map 21.

Electroplating for the trade comprises establishments primarily engaged in all types of electroplating, plating, anodizing, coloring, and finishing of metals and formed products for the trade. Most of the work done in this industry is done on materials owned by others. Automobile assembly plants and repair shops for automotive vehicles and machinery use this type of service to a great extent.

The value of shipments has doubled in the last decade, reaching $518 million in 1963. In 1967, the industry nationwide consisted of 546 plants with 29,598 employees, while the six-state area had 20 plants with 1,157 employees, or 3.9% of the national total.

The galvanizing, coating, and engraving of metal products industry tripled its value of shipments from $105 million in 1954 to $322 million in 1963. There are 173 plants with 13,718 persons engaged in this trade in the nation, but only eight plants with 650 employees were reported in the six-state area.

Selected Nonelectrical Machinery

Eight product groups were selected for review under nonelectrical machinery. They are (1) construction machinery; (2) industrial cranes, hoists, and monorails; (3) cutting-type machine tools; (4) metal-forming-type machine tools; (5) dies, jigs, fixtures, and molds; (6) machine tool accessories and measuring devices; (7) metalworking machinery, n.e.c.; and (8) printing trades machinery and equipment.

Value of shipments, number of plants, and employment of these eight industries are given in Table 33. In 1963, the value of shipments, an indication of the size of the market for each industry, varied from $2,696 million for construction machinery to $220 million for industrial cranes, hoists, and monorails. In the five-year period between 1958 and 1963, the increase in shipments ranged from 56% for cutting-type machine tools to 18.9% for industrial cranes, hoists, and monorails.

The size of the selected industries in the six-state area can be indicated by the number of plants and the employment totals given in Table 33. All of the eight selected industries have two common characteristics. First, steel is

MAP 21
LDCATIDNS DF PRDDUCERS DF METAL
STAMPINGS IN THE UNITED STATES, 1967

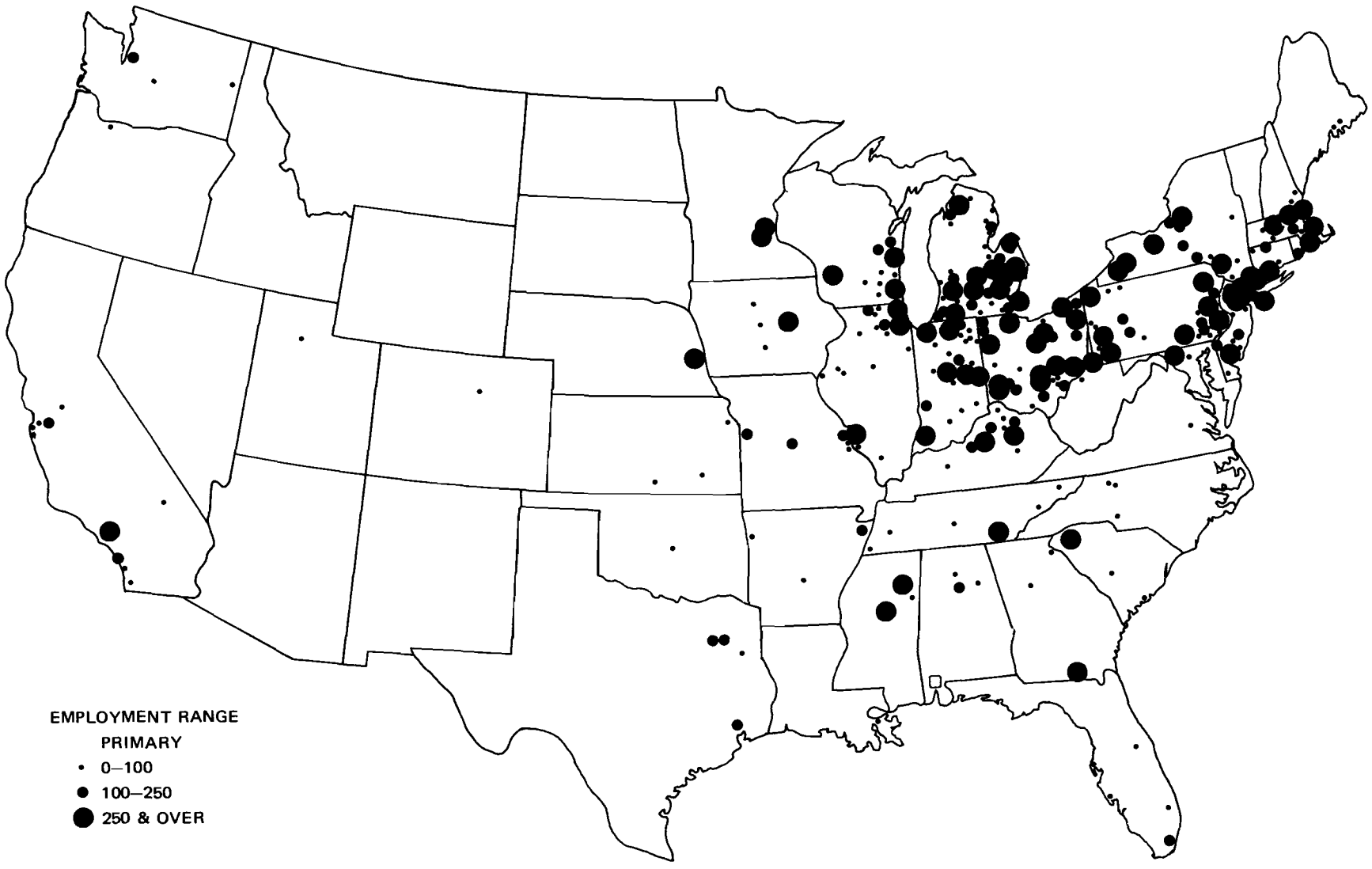


Table 33

VALUE OF SHIPMENTS, NUMBER OF PLANTS, AND EMPLOYMENT OF SELECTED NONELECTRICAL MACHINERY PRODUCT GROUPS IN THE UNITED STATES, 1958, 1963, AND 1967

SIC	Industries	Value of Shipments (in millions of dollars) 1958	1963	Percent Increase	Number of Plants, 1967 U. S.	Six States	Employment, 1967 U. S.	Six States	% of U. S.
3531	Construction machinery	2,107	2,696	27.9	352	15	134,099	2,935	2.2
3536	Industrial cranes, hoists, and monorails	185	220	18.9	82	2	16,578	370	2.2
3541	Cutting-type machine tools	680	1,061	56.0	259	4	80,315	326	0.4
3542	Metal-forming-type machine tools	318	441	38.7	160	7	28,857	630	2.2
3544	Dies, jigs, fixtures, and molds	1,061	1,389	30.9	994	30	68,365	1,219	1.8
3545	Machine tool accessories	511	787	54.0	500	7	59,876	568	0
3548	Metalworking machinery, n.e.c.	602	796	32.2	218	7	40,781	1,065	2.6
3555	Printing trades machinery	310	448	44.5	161	2	30,589	78	0

Sources: U. S. Bureau of the Census, Census of Manufactures, 1963, and Iron Age, Metalworking Marketguide.

the basic raw material used in their manufacture and, second, they are underrepresented in the six-state area in terms of number of plants and employment. For example, construction employment in the six-state area was 465,200 persons in 1966, or 14.2% of the U. S. total (Table 29), yet the employment in the 15 plants engaged in making construction machinery in the area represents only 2.2% of the industry's total employment. This indicates that a major portion of the construction machinery used in the area has to be shipped in from northern states.

It was stated repeatedly during interviews for this study that the area is lacking in specialty steel and stainless steel for making high-speed or precision machinery and equipment. Yet to steel producers, the reverse is true -- the area has few major users of quality steels. On the other hand, the economic growth of the area has reached the stage in which both are needed in order to sustain the growth momentum created in the past two decades.

The distribution and sizes of plants manufacturing industrial cranes, hoists, and monorails are given on Map 22. Producers of metal-forming-type machine tools are presented on Map 23, and producers of printing trade machinery and equipment are shown on Map 24.

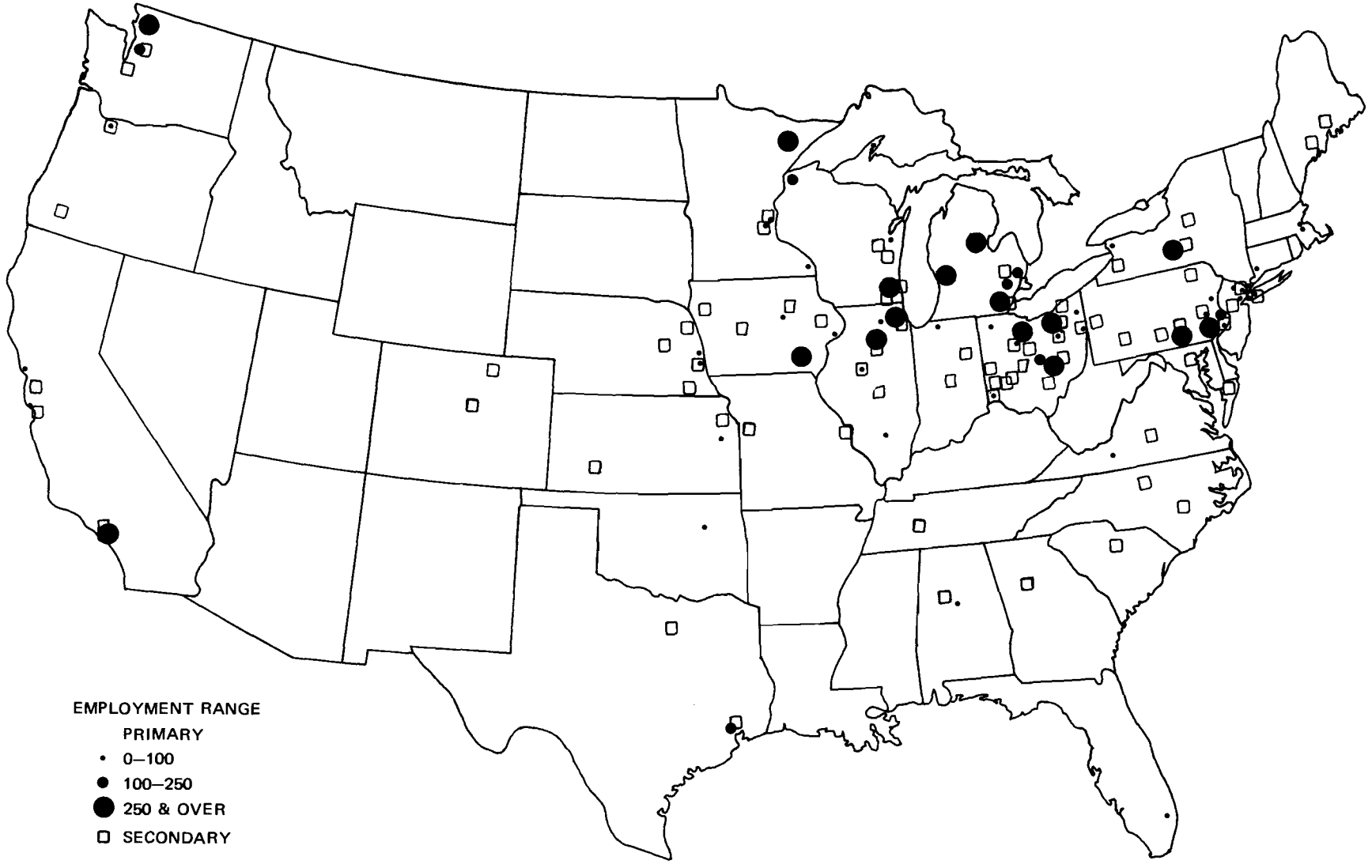
Selected Transportation Equipment

Two transportation equipment product groups were selected for discussion -- motor vehicle parts and accessories and locomotives and parts.

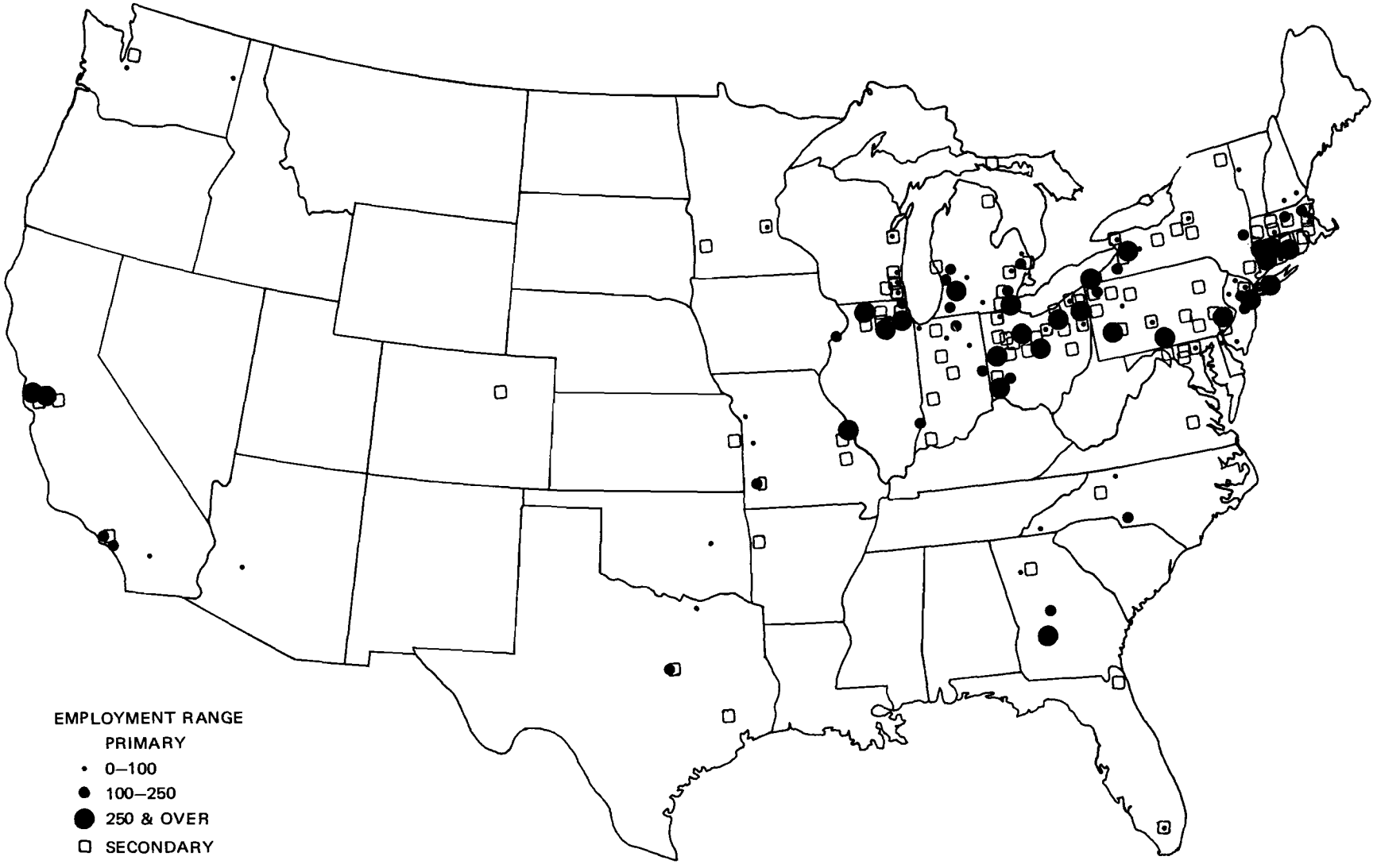
Motor vehicle parts and accessories (SIC 37176) represent replacement parts and accessories for cars, trucks, buses, and trailers for domestic uses. They include spark plugs, ignition coils, storage batteries, carburetors, pistons and piston rings, headlights, springs, and other hardware. Shipments of these replacement parts rose from $1,141 million in 1958 to $1,734 million in 1963, a 52% increase in the five-year period.

The nation has 662 plants with 352,389 persons employed in auto parts manufacturing. The distribution of these plants is presented on Map 25. There are about 35 plants engaged in the manufacture of auto parts in the six-state area; however, their aggregate employment of 9,000 persons represents only 2.6% of the industry's total. In contrast, the area had 12.1% of all new automobiles registered in the nation and 13.4% of all new trucks registered in 1966.

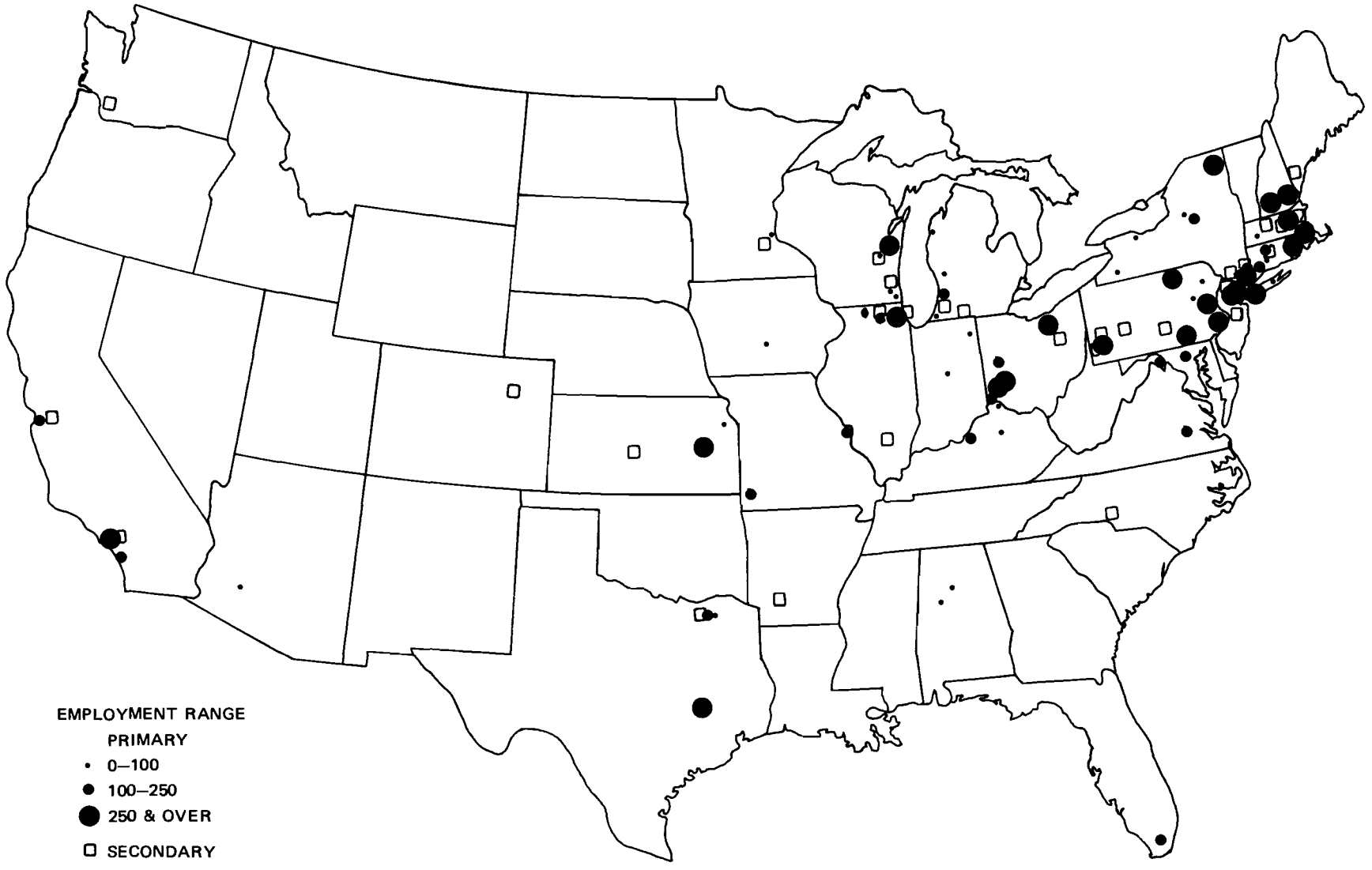
MAP 22
LOCATIONS OF PRODUCERS OF INDUSTRIAL CRANES, HOISTS, AND MONORAILS IN THE UNITED STATES, 1967



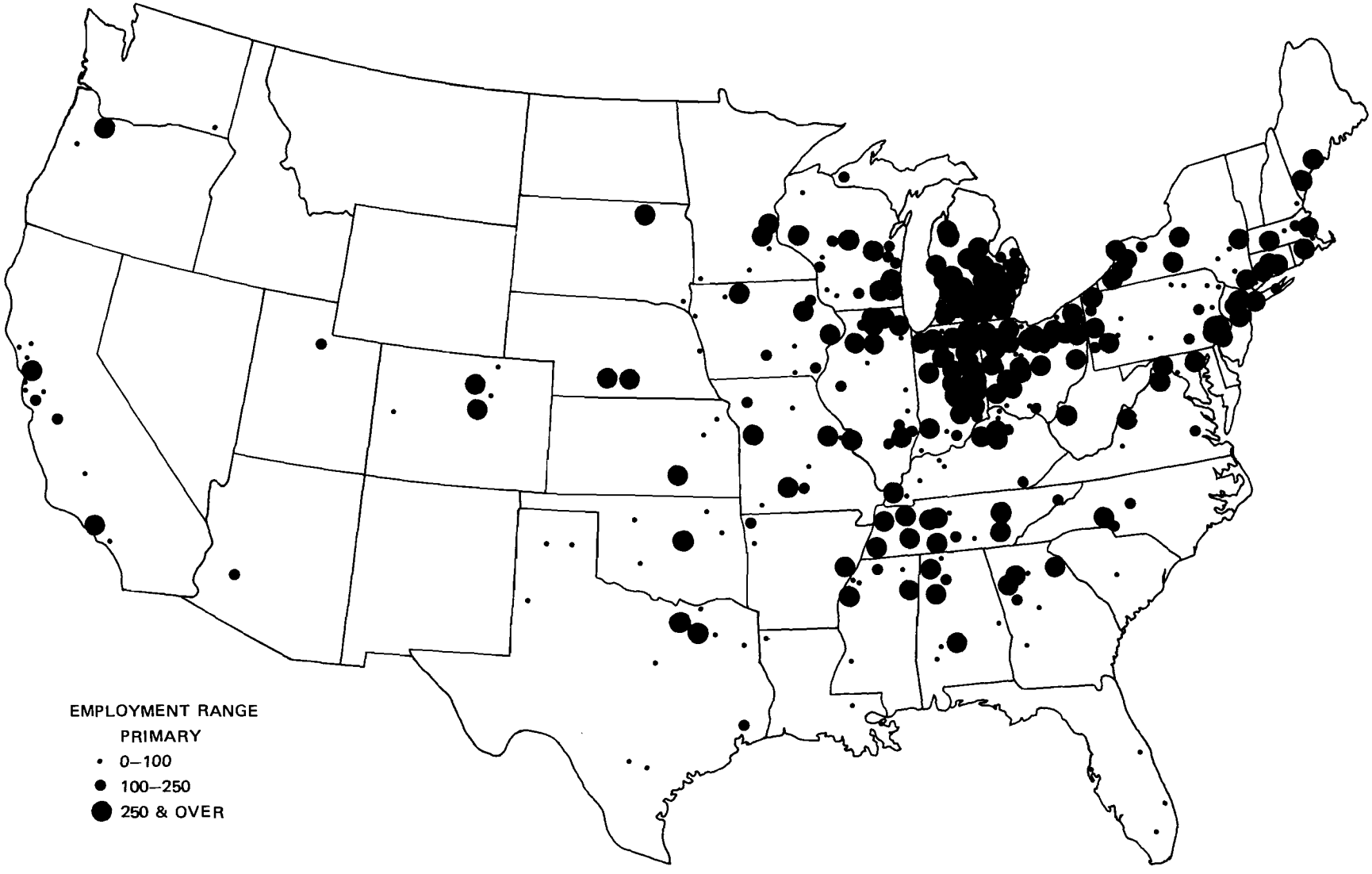
MAP 23
LOCATIONS OF PRODUCERS OF METAL–FORMING–TYPE MACHINE TOOLS IN THE UNITED STATES, 1967



MAP 24
LOCATIONS OF PRODUCERS OF PRINTING MACHINERY AND EQUIPMENT IN THE UNITED STATES, 1967



MAP 25
LOCATIONS OF PRODUCERS OF MOTOR VEHICLE PARTS AND ACCESSORIES IN THE UNITED STATES, 1967



(See Table 29.) Several major automobile companies have assembly plants in Atlanta. It was reported that one of these plants was closed down over a one-week period a year ago because of delayed delivery of certain parts from the North. Certainly the need for more parts manufacturers in the area should be investigated.

Locomotives and parts (SIC 3741) represent an industry engaged in building and rebuilding locomotives. The market for this industry has not grown as rapidly as those for other industries in the last decade, but it still represents a sizable annual market. In 1963, the value of shipments totaled $438 million. The nation contains only 18 plants with 27,155 employees in this industry, and no manufacturing plant of such type is located in the study area. Major producers in this industry are located in the northeastern and midwestern regions. (See Map 26.) Economic advantage and the convenience of the service performed would seem to indicate the necessity of establishing such a facility in the study area.

Selected Instruments and Photographic Equipment

Two product groups were selected under this heading -- mechanical measuring and controlling instruments (SIC 3821) and photographic equipment and supplies (SIC 3861). Products of these two industries are various and their uses are extensive.

Mechanical measuring and controlling instruments comprise the manufacture of industrial process instruments for indicating, recording, measuring, and controlling temperature, pressure and vacuum, fluid flow and liquid level, mechanical motion, rotation, humidity, density, acidity, alkalinity, and combustion; dial pressure gauges; apparatus for testing physical properties such as hardness, tension, compression, torsion, ductility; and elasticity testing apparatus. The shipments of these instruments increased from $727 million in 1958 to $1,143 million in 1963 -- a 57% gain in the five-year period.

The growth of the mechanical measuring and controlling instruments industry in the six-state area has been quite rapid. Between 1957 and 1967, the area's employment in this industry increased 278% compared with a 60% increase in the nation. Ten plants with an employment of 1,208 persons currently are located in the six-state area, but they represent only 1.75% of the U. S. industry's employment.

MAP 26
LOCATIONS OF PRODUCERS OF LOCOMOTIVES AND PARTS IN THE UNITED STATES, 1967

The photographic equipment and supplies industry represents a market of over $2 billion annually. Manufacturers' shipments increased from $1,205 million in 1958 to $1,851 million in 1963 -- a 54% increase in the five-year period. The six-state area contains three plants with a total of 756 persons engaged in this type of manufacturing, while the nation has 108 plants with 43,026 employees; only 1.8% of the industry's employment is in the six-state area. Plant locations and sizes in the United States are given on Map 27.

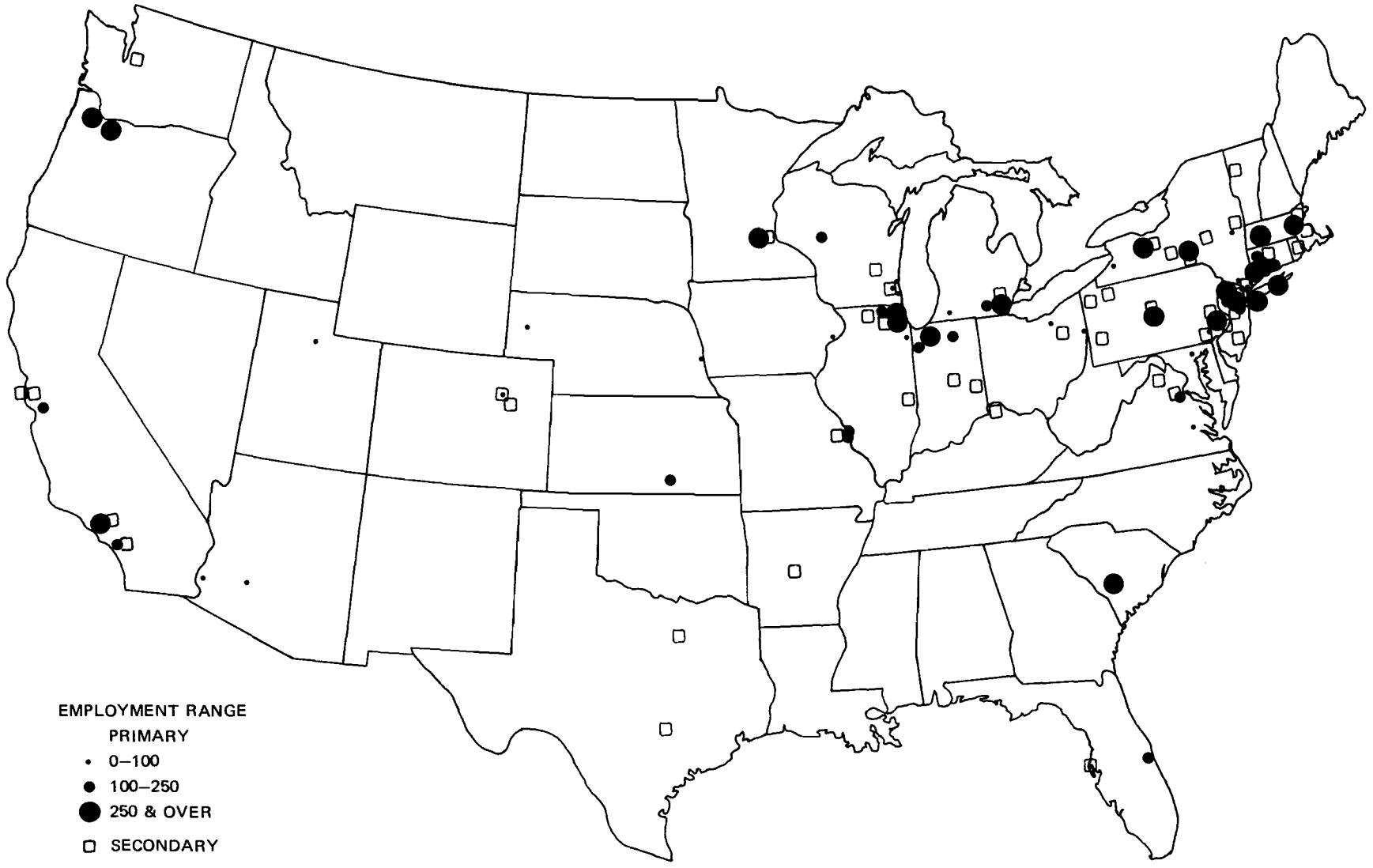
Metal Toys and Games

The market for metal toys and games was estimated at $350 million in 1963 and at $400 million currently. Two plants with total employment of 165 persons are engaged in the manufacture of metal toys in the area, compared with 82 plants in the nation with a total employment of 32,025 persons. Map 28 indicates the major producers of toys and games (SIC 3941), including metal and nonmetal, in the nation.

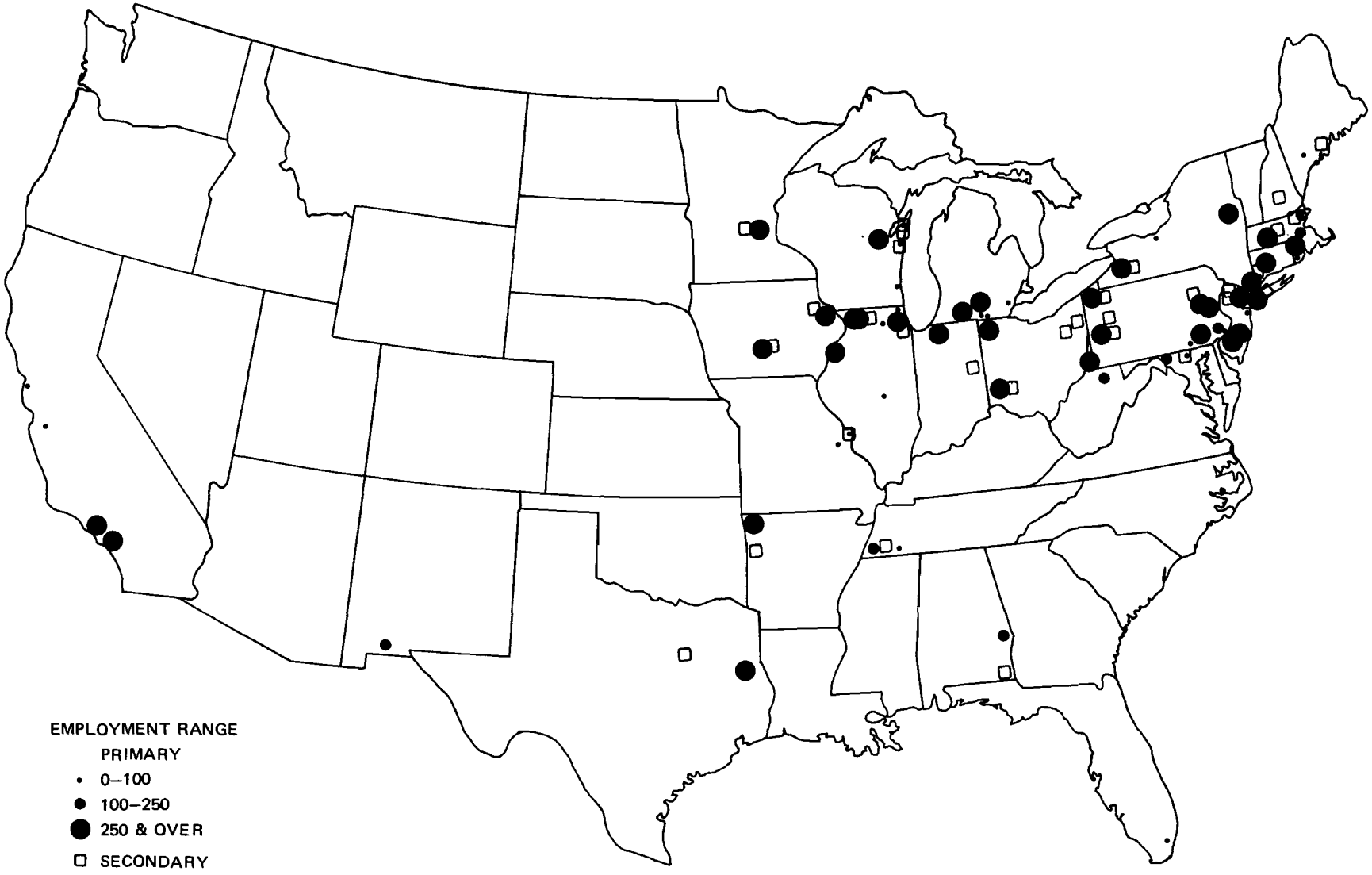
Structural Steel Fabrication

In addition to the 28 product groups given above, fabricators of structural steel (SIC 3441) are needed at many locations in the Southeast, particularly in the Atlanta Metropolitan Area. According to a trade source, metropolitan areas with a population of over 250,000 generally have at least one large structural steel fabricator located in the area. However, the booming Atlanta Metropolitan Area has no major fabricators of structural steel and must be served by outside fabricators.

MAP 27
LOCATIONS OF PRODUCERS OF PHOTOGRAPHIC EQUIPMENT AND SUPPLIES IN THE UNITED STATES, 1967



MAP 28
LOCATIONS OF PRODUCERS OF TOYS AND GAMES IN THE UNITED STATES, 1967



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APPENDICES

Appendix 1

STEEL INGOT PRODUCTION VS. POPULATION IN THE UNITED STATES, 1900-1967

Year	U. S. Production of Ingots and Steel for Castings (in millions of tons)1/	U. S. Population (in millions of persons)2/	Year	U. S. Production of Ingots and Steel for Castings (in millions of tons)1/	U. S. Population (in millions of persons)2/
1900	11.2	76.1	1934	29.2	126.5
1901	14.8	77.6	1935	38.2	127.4
1902	16.4	79.2	1936	53.5	128.2
1903	15.9	80.6	1937	56.6	129.0
1904	15.2	82.2	1938	31.8	130.0
1905	21.9	83.8	1939	52.8	131.0
1906	25.4	85.4	1940	67.0	132.1
1907	25.4	87.0	1941	82.8	133.4
1908	15.4	88.7	1942	86.0	134.9
1909	26.2	90.5	1943	88.8	136.7
1910	28.3	92.4	1944	89.6	138.4
1911	25.9	93.9	1945	79.7	140.0
1912	34.1	95.3	1946	66.6	141.4
1913	34.1	97.2	1947	84.9	144.1
1914	25.6	99.1	1948	88.6	146.6
1915	35.2	100.5	1949	78.0	149.2
1916	46.8	102.0	1950	96.8	151.7
1917	49.8	103.4	1951	105.2	154.4
1918	49.0	104.6	1952	93.2	157.0
1919	38.1	105.1	1953	111.6	159.6
1920	46.2	106.5	1954	88.3	162.4
1921	21.6	108.5	1955	117.0	165.3
1922	38.9	110.1	1956	115.2	168.2
1923	49.0	112.0	1957	112.7	171.2
1924	41.4	114.1	1958	85.3	174.1
1925	49.7	115.8	1959	93.4	177.3
1926	52.9	117.4	1960	99.3	180.7
1927	49.3	119.0	1961	98.0	183.7
1928	56.6	120.5	1962	98.3	186.6
1929	61.7	121.8	1963	109.3	189.4
1930	44.6	123.2	1964	127.1	192.1
1931	28.6	124.1	1965	131.5	194.6
1932	15.1	124.9	1966	134.1	196.9
1933	25.7	125.7	1967	127.2	199.1

Sources: 1/ American Iron and Steel Institute, Annual Statistical Reports, New York, N. Y.

2/ As of July 1, U. S. Bureau of the Census.

Appendix 2

NET SHIPMENTS OF STEEL PRODUCTS IN THE UNITED STATES, 1958-1967
ALL GRADES (INCLUDING CARBON, ALLOY, AND STAINLESS STEEL)
(in thousands of net tons)

Steel Products	1967		1966		1965		1964		1963		1962		1961		1960		1959		1958	
	Ship-ments	%	Ship-ments	%	Ship-ments	%	Ship-ments	%	Ship-ments	%	Ship-ments	%	Ship-ments	%	Ship-ments	%	Ship-ments	%	Ship-ments	%
Ingots and steel castings	289	0.3	284	0.3	366	0.4	330	0.4	257	0.3	219	0.3	224	0.3	338	0.5	335	0.5	267	0.5
Blooms, slabs, billets, sheet bars	2,479	3.0	2,135	2.4	2,696	2.9	2,572	3.0	1,725	2.3	1,497	2.1	1,302	2.0	1,418	2.0	1,499	2.2	1,142	1.9
Tube rounds	26	...	16	...	16	...	33	0.1	36	0.1	22	...	19	...	17	...	15	...	11	...
Skelp	2	...	5	...	111	0.1	99	0.1	34	...	11	...	68	0.1	130	0.2	41	...	114	0.2
Wire rods	1,266	1.5	1,366	1.5	1,338	1.5	1,195	1.4	1,100	1.5	1,017	1.5	935	1.4	918	1.3	980	1.4	895	1.5
Structural shapes (heavy)	5,592	6.7	6,176	6.9	6,165	6.7	5,586	6.6	4,899	6.5	4,367	6.2	4,340	6.6	4,836	6.8	4,091	5.9	3,965	6.6
Steel piling	541	0.6	588	0.6	633	0.7	500	0.6	417	0.5	373	0.5	395	0.6	423	0.6	341	0.5	440	0.7
Plates	7,948	9.5	9,103	10.1	9,764	10.5	8,491	10.0	7,234	9.6	6,267	8.9	5,949	9.0	6,132	8.6	5,819	8.4	5,268	8.8
Rails—Standard (over 60 lbs.)	685	0.8	858	1.0	702	0.8	636	0.7	494	0.7	481	0.7	407	0.6	668	0.9	590	0.9	539	0.9
—All other	46	0.1	43	...	49	...	39	...	35	...	63	0.1	58	0.1	47	0.1	42	0.1	40	0.1
Joint bars	31	...	42	...	45	...	30	...	41	0.1	24	...	19	...	27	...	31	...	34	...
Tie plates	145	0.2	195	0.2	138	0.1	135	0.2	115	0.2	88	0.1	70	0.1	124	0.2	143	0.2	109	0.2
Track spikes	62	0.1	68	0.1	62	0.1	58	0.1	50	0.1	43	0.1	35	0.1	45	0.1	52	0.1	41	0.1
Wheels (rolled and forged)	285	0.3	343	0.4	328	0.4	320	0.4	262	0.3	239	0.3	187	0.3	243	0.3	233	0.3	156	0.3
Axles	181	0.2	227	0.3	199	0.2	176	0.2	110	0.1	92	0.1	61	0.1	112	0.2	97	0.1	71	0.1
Bars—Hot rolled (including light shapes)	7,961	9.5	9,126	10.2	9,344	10.1	8,401	9.9	7,568	10.0	7,166	10.2	6,379	9.6	6,915	9.7	6,936	10.0	5,647	9.4
—Reinforcing	3,249	3.9	3,276	3.6	3,150	3.4	3,229	3.8	2,683	3.6	2,389	3.4	2,442	3.7	2,214	3.1	2,173	3.1	2,035	3.4
—Cold finished	1,733	2.1	1,999	2.2	1,877	2.0	1,467	1.7	1,319	1.7	1,345	1.9	1,171	1.8	1,385	2.0	1,409	2.0	1,023	1.7
Tool steel	110	0.1	121	0.1	118	0.1	102	0.1	94	0.1	95	0.1	80	0.1	87	0.1	96	0.2	70	0.1
Pipe and tubing—Standard	2,712	3.2	2,734	3.0	2,513	2.7	2,264	2.7	2,211	2.9	2,065	2.9	2,062	3.1	2,132	3.0	2,211	3.2	2,175	3.6
—Oil country goods	1,340	1.6	1,413	1.6	1,574	1.7	1,637	1.9	1,494	2.0	1,503	2.1	1,522	2.3	1,197	1.7	2,067	3.0	1,158	1.9
—Line	3,095	3.7	3,110	3.4	2,777	3.0	2,634	3.1	2,260	3.0	2,473	3.5	2,544	3.9	2,690	3.8	2,803	4.0	2,608	4.4
—Mechanical	1,052	1.3	1,224	1.4	1,133	1.2	1,009	1.2	829	1.1	814	1.2	683	1.0	763	1.0	970	1.4	561	0.9
—Pressure	260	0.3	332	0.4	326	0.4	288	0.3	248	0.3	248	0.4	256	0.4	271	0.4	261	0.4	245	0.4
—Structural	473	0.6	420	0.5	366	0.4	305	0.4	...	...	...	...	...	...	...	...	...	...	...	...
—Stainless	36	...	(Included in totals above)																	
Wire—Drawn	2,507	3.0	2,798	3.1	2,842	3.1	2,518	3.0	2,523	3.3	2,513	3.6	2,436	3.7	2,440	3.4	2,726	3.9	2,363	3.9
—Nails and staples	334	0.4	332	0.4	321	0.4	316	0.4	316	0.4	321	0.4	332	0.5	320	0.5	392	0.6	418	0.7
—Barbed and twisted	102	0.1	168	0.2	107	0.1	79	0.1	111	0.1	86	0.1	74	0.1	48	0.1	49	0.1	56	0.1
—Woven wire fence	116	0.1	127	0.1	112	0.1	112	0.1	119	0.2	116	0.2	124	0.2	104	0.1	141	0.2	157	0.3
—Bale ties and baling wire§	74	0.1	71	0.1	103	0.1	80	0.1	70	0.1	72	0.1	70	0.1	63	0.1	56	0.1	57	0.1
Black plate	604	0.7	484	0.5	458	0.5	431	0.5	420	0.6	464	0.7	523	0.8	576	0.8	562	0.8	621	1.0
Tin and terne plate—Hot dipped	39	0.1	50	0.1	127	0.1	150	0.2	190	0.3	199	0.3	286	0.4	390	0.6	412	0.6	447	0.8
Tin plate—Electrolytic	5,948	7.1	5,294	5.9	6,074	6.6	5,501	6.4	5,248	6.9	5,401	7.6	5,313	8.1	5,075	7.1	4,858	7.0	5,040	8.4
Sheets—Hot rolled	9,312	11.1	10,137	11.3	10,630	11.5	9,948	11.7	8,826	11.7	7,753	11.0	7,024	10.6	7,991	11.2	7,844	11.3	6,291	10.5
—Cold rolled	14,709	17.5	15,972	17.7	16,571	17.9	15,699	18.5	14,510	19.2	13,510	19.2	12,153	18.4	14,466	20.3	12,751	18.4	10,326	17.2
Sheets and strip—Galvanized—Hot dipped	4,219	5.0	4,545	5.0	4,491	4.8	4,052	4.8	3,922	5.2	3,533	5.0	3,330	5.0	3,057	4.3	2,773	4.0	2,829	4.7
—Electrolytic	327	0.4	322	0.4	362	0.4	319	0.4												
—All other metallic coated	503	0.6	571	0.6	571	0.6	512	0.6	385	0.5	316	0.4	256	0.4	261	0.4	280	0.4	190	0.3
—Electrical	721	0.9	741	0.8	740	0.8	648	0.8	542	0.7	551	0.8	527	0.8	568	0.8	632	0.9	476	0.8
Strip—Hot rolled	1,409	1.7	1,597	1.8	1,785	1.9	1,660	1.9	1,486	2.0	1,356	1.9	1,216	1.8	1,332	1.9	1,273	1.8	1,048	1.8
—Cold rolled	1,374	1.6	1,582	1.8	1,582	1.7	1,384	1.6	1,372	1.8	1,460	2.1	1,254	1.9	1,326	1.8	1,393	2.0	981	1.7
TOTAL STEEL PRODUCTS	83,897	100.0	89,995	100.0	92,666	100.0	84,945	100.0	75,555	100.0	70,552	100.0	66,126	100.0	71,149	100.0	69,377	100.0	59,914	100.0
Carbon	76,042	90.6	81,089	90.1	84,118	90.8	77,608	91.4	69,510	92.0	65,077	92.2	61,470	93.0	66,189	93.0	64,172	92.5	56,077	93.6
Stainless and heat resisting	837	1.0	933	1.0	879	0.9	771	0.9	659	0.9	632	0.9	565	0.8	579	0.8	615	0.9	493	0.8
Alloy (other than stainless)	7,018	8.4	7,973	8.9	7,669	8.3	6,566	7.7	5,386	7.1	4,843	6.9	4,091	6.2	4,381	6.2	4,590	6.6	3,344	5.6

Source: American Iron and Steel Institute, Annual Statistical Report, 1967.

Appendix 3

U. S. RAW STEEL FORECASTS
(in millions of tons)

I. U. S. Production

1970	1975	1980	1988	2000	Source
				200	American Metal Market, 1/22/68
			189m		American Metal Market, 7/25/68
140					Brick & Clay Record, 6/67, projection by a research director at Cahners Publications.
145	160	180			Brick & Clay Record, 6/67, projection by official of Martin-Marietta Co.
	170				Ceramic Age, 3/68
155	183	206			Foundry, 9/67
	140m				Industrial Minerals, 6/68
		180			Steel, 11/25/68
	162	180			Lionel D. Edie & Co., New York, letter dated April 28, 1969
	183	206			University of Michigan, Energy and the Michigan Economy, 1967

m = metric ton

II. U. S. Production by Type of Furnace

Furnace Type	Lionel D. Edie & Co.		Brick & Clay Record[a/]	
	1975	1980	1975	1980
Basic Oxygen	100	120	95	125
Electric	38	50	25	30
Open Hearth & Bessemer	24	10	40	25
Total	162	180	160	180

a/ In article by R. A. Grancher, Director, Market Planning, Cement & Lime Division, Martin-Marietta Co., June 1967.

III. U. S. Production, Shipments, Exports, Imports, and Consumption

	Lionel D. Edie & Co.		University of Michigan[a/]	
	1975	1980	1975	1980
Production	162	180	183	206
Shipments	115[b/]	135[b/]	137.8	162.2
Exports	4	4	5.5	6.5
Imports	-	-	9	7
Consumption[c/]	-	-	141.3	162.7

a/ University of Michigan, Graduate School of Business Administration, Energy and the Michigan Economy, 1967.

b/ Assumes that shipments will be 71% of production in 1975 and 75% in 1980.

c/ Shipments minus exports plus imports.

Appendix 4

EMPLOYEES AND NUMBER OF PLANTS OF METALWORKING INDUSTRIES
IN THE UNITED STATES AND IN THE SIX SOUTHEASTERN STATES, 1967

Standard Industrial Code	Industry	Total United States			Six Southeastern States			
		Employees	Plants	% Change 1957-67	Employees	Plants	% of U. S.	% Change 1957-67
19	ORDNANCE AND ACCESSORIES	293,293	159	138	4,330	7	1.48	87
1911	Guns, Howitzers, Mortars	21,523	7		0	0	0.00	
1925	Guided Missiles and Space Vehicles	149,545	24		800	1	0.53	
1929	Ammunition, N.E.C.	65,574	61		3,460	5	5.28	
1931	Tanks and Tank Components	4,070	4		0	0	0.00	
1941	Sighting and Fire Control Equipment	2,200	7		0	0	0.00	
1951	Small Arms	20,236	32		70	1	0.35	
1961	Small Arms Ammunition	9,078	7		0	0	0.00	
1999	Ordnance, N.E.C.	21,067	17		0	0	0.00	
25	METAL FURNITURE	137,434	845	39	12,870	83	9.36	145
2514	Metal Household Furniture	33,269	208	19	5,108	28	15.35	256
2515	Mattresses and Bed Springs	16,186	134	16	2,936	19	18.12	52
2522	Metal Office Furniture	30,954	127	51	1,420	7	4.59	
2531	Public Building Furniture	19,265	83	80	1,951	11	10.13	
2542	Partitions, Shelving, Store Fixtures	25,186	195	45	1,255	13	4.98	
2591	Metal Window Shade Accessories	8,049	38	164	0	0	0.00	0
2599	Other Metal Furniture	4,525	60	17	200	4	4.42	809
33	PRIMARY METALS	1,324,671	3,447	13	66,730	212	5.04	4
3311	Blast Furnaces, Not Integrated	4,907	16	- 58	1,367	5	27.86	- 60
3312	Steel Works and Rolling Mills	528,813	169	- 4	14,505	12	2.74	- 36
3313	Electrometallurgical Products	12,269	33	- 14	1,821	6	14.84	8
3315	Steel Wire Drawing and Nails, Not Integrated	20,931	92	65	345	4	1.65	721
3316	Cold Steel Finishing Mills, Not Integrated	16,436	88	1	0	0	0.00	0
3317	Steel Pipe and Tubes, Not Integrated	41,147	157	82	1,684	9	4.09	381

Appendix 4 (continued)

Standard Industrial Code	Industry	Total United States			Six Southeastern States			
		Employees	Plants	% Change 1957-67	Employees	Plants	% of U. S.	% Change 1957-67
3321	Grey Iron Foundries	137,763	772	22	19,165	66	13.71	9
3322	Malleable Iron Foundries	23,976	52	1	0	0	0.00	0
3323	Steel Foundries	64,652	210	18	1,762	13	2.73	44
3331	Primary Smelting, Copper	40,755	28	85	1,900	1	4.66	*
3332	Primary Smelting, Lead	3,395	12	25	0	0	0.00	0
3333	Primary Smelting, Zinc	10,177	17	11	0	0	0.00	- 100
3334	Primary Aluminum Production	28,628	24	12	2,400	3	8.38	- 11
3339	Other Nonferrous Smelting and Refining	18,519	36	246	320	2	1.73	*
3341	Secondary Nonferrous Smelters	15,549	144	202	1,067	14	6.86	*
3351	Rolling, Drawing, Extruding Copper and Brass	45,364	85	10	900	1	1.98	53
3352	Rolling, Drawing, Extruding Aluminum	59,881	141	18	14,257	16	23.81	35
3356	Rolling, Drawing, Extruding Other Nonferrous Metals	22,932	72	59	80	2	0.35	- 92
3357	Drawing and Insulating Nonferrous Wire	73,632	191	60	3,762	15	4.85	417
3361	Aluminum Foundries	43,661	389		345	8	0.79	
3362	Copper Foundries	8,318	154	15	330	5	3.97	- 37
3369	Other Nonferrous Foundries	22,661	145		50	2	0.22	
3391	Iron and Steel Forgings	51,772	196	- 1	230	3	0.44	10
3392	Nonferrous Forgings	6,593	16	149	0	0	0.00	0
3395	Heat Treating, Commercial	7,910	134	48	65	2	0.85	210
3399	Primary Metal Products, N.E.C.	8,003	74	117	375	2	4.69	838
34	FABRICATED METAL PRODUCTS	1,248,268	9,549	31	78,412	661	6.28	130
3411	Tin Cans	64,696	211	24	3,865	17	5.97	
3421	Cutlery	15,066	74	34	0	0	0.00	- 100
3423	Hand and Edge Tools	36,558	284	6	1,275	10	3.49	712
3425	Hand Saws and Saw Blades	6,770	57	44	115	1	1.70	92
3429	Hardware	104,799	451	91	5,825	21	5.56	140
3431	Enameled Metal Sanitary Ware	9,854	70	13	1,060	4	10.76	23

* No plants or employees in 1957.

Appendix 4 (continued)

Standard Industrial Code	Industry	Total United States			Six Southeastern States			
		Employees	Plants	% Change 1957-67	Employees	Plants	% of U. S.	% Change 1957-67
3432	Plumbing Brass Goods	28,468	129	- 1	1,380	5	4.85	150
3433	Heating Equipment, Except Electric and Water Heaters	40,016	253	- 9	3,760	14	9.40	136
3441	Fabricated Structural Steel	97,754	911	17	11,474	116	11.74	61
3442	Metal Doors, Sash, Frames, Moldings	59,357	568	33	8,430	78	14.20	135
3443	Fabricated Steel Plate Products	87,517	670	16	9,934	57	11.35	187
3444	Sheet Metal Work, Ferrous and Nonferrous	73,540	1,055	36	6,029	112	8.20	121
3446	Architectural and Ornamental Metal Work	13,560	192		1,500	22	11.06	
3449	Miscellaneous Metal Work	31,311	292		4,225	46	13.49	
3451	Screw Machine Products	31,456	492	- 9	683	14	2.17	103
3452	Bolts, Nuts, Screws, Rivets, Washers	68,951	375	72	2,130	13	3.09	118
3461	Stampings	218,733	1,156	26	3,787	25	1.73	99
3464	Powder Metal Parts	5,710	40	- 8	75	1	1.31	7
3471	Electroplating for Trade	29,577	546	43	1,157	20	3.91	333
3479	Galvanizing and Other Coating	13,718	173	135	650	8	4.74	966
3481	Wirework and Wire Springs	58,778	566	9	3,573	36	6.08	
3491	Metal Shipping Boards	13,787	118	15	743	11	5.39	124
3492	Safes and Vaults	2,187	11	- 3	0	0	0.00	0
3493	Steel Springs, Leaf and Hot Wound	5,513	49	- 28	0	0	0.00	0
3494	Valves and Fittings	87,749	448	104	4,749	13	5.41	99
3496	Collapsible Tubes	4,275	16	17	0	0	0.00	0
3497	Metal Foil and Foil Containers	4,383	23	484	920	2	20.99	*
3498	Fabricated Pipes, Bends, Nipples	13,091	149	- 25	525	7	4.01	320

* No plants or employees in 1957.

Appendix 4 (continued)

Standard Industrial Code	Industry	Total United States			Six Southeastern States			
		Employees	Plants	% Change 1957-67	Employees	Plants	% of U. S.	% Change 1957-67
3499	Miscellaneous Fabricated Metal Products	21,074	170	51	548	8	2.60	286
35	MACHINERY, EXCEPT ELECTRICAL	1,742,884	8,997	50	74,597	491	4.28	130
3511	Steam Engines and Turbines	33,377	33	87	0	0	0.00	- 100
3519	Internal Combustion Engines	52,395	63	- 7	467	3	0.89	*
3522	Farm Machinery and Tractors	134,337	543	21	7,980	42	5.94	
3531	Construction Machinery	134,099	352	55	2,935	15	2.19	56
3532	Mining Machinery and Equipment	25,547	113	73	792	5	3.10	- 27
3533	Oil Field Machinery and Tools	34,355	181	- 4	0	0	0.00	0
3534	Elevators and Escalators	13,871	97	52	300	5	2.16	3
3535	Conveyors	25,820	197	59	1,426	12	5.52	415
3536	Industrial Cranes, Hoists	16,578	82	92	370	2	2.23	*
3537	Industrial Trucks	26,904	132	128	1,060	12	3.94	184
3541	Machine Tools, Cutting Type	80,315	259	3	326	4	0.41	*
3542	Machine Tools, Metal Forming Type	28,857	160	- 8	630	7	2.18	129
3544	Dies, Jigs, Fixtures, Molds	68,365	994	33	1,219	30	1.78	296
3545	Cutting Tools, Gages	59,876	500	43	568	7	0.95	284
3547	Portable Tools, Power	22,414	65	50	1,425	2	6.36	*
3548	Metalworking Machinery	40,781	218	95	1,065	7	2.61	752
3551	Food Products Machinery	36,170	298	13	2,511	20	6.94	167
3552	Textile Machinery	44,216	237	31	15,281	93	34.56	153
3553	Woodworking Machinery	14,545	102	37	2,670	13	18.36	401
3554	Paper Machinery	22,680	124	50	387	4	1.71	1,835
3555	Printing Machinery	30,589	161	85	78	2	0.25	*
3556	Foundry Machinery	4,868	37	178	0	0	0.00	0
3559	Other Special Industrial Machinery	50,059	359	43	2,218	20	4.43	- 14
3561	Pumps and Compressors	70,616	320	30	3,754	17	5.32	471
3562	Ball and Roller Bearings	60,781	94	28	1,075	3	1.77	1,244

* No plants or employees in 1957.

Appendix 4 (continued)

Standard Industrial Code	Industry	Total United States			Six Southeastern States			
		Employees	Plants	% Change 1957-67	Employees	Plants	% of U. S.	% Change 1957-67
3564	Blowers and Ventilating Fans	21,807	134	50	1,305	7	5.98	31
3565	Industrial Patterns	3,345	61		105	2	3.14	
3566	Mechanical Power Transmission Equipment	59,399	380	24	941	15	1.58	- 25
3567	Industrial Furnaces and Ovens	16,771	145	107	95	2	0.57	- 47
3569	Other General Industrial Machinery	27,711	230	27	838	10	3.02	- 15
3571	Computing Machines and Cash Registers	164,370	153	197	9,460	11	5.76	1,871
3572	Typewriters	17,260	12	- 6	60	1	0.35	- 33
3576	Scales and Balances	6,519	34	21	0	0	0.00	0
3579	Other Office and Store Machines	19,146	77	27	528	4	2.76	1,157
3581	Vending Machines	11,315	57	48	430	3	3.80	*
3582	Commercial Laundry Machines	7,704	51	25	375	5	4.87	650
3584	Industrial Vacuum Cleaners	3,108	13	45	0	0	0.00	0
3585	Commercial Refrigeration and Air Conditioning Equipment	100,050	336	141	4,743	26	4.74	242
3586	Measuring and Dispensing Pumps	6,556	22	- 6	650	1	9.91	*
3589	Other Service Industry Machines	22,816	201	60	1,340	15	5.87	240
3599	Machinery and Parts, N.E.C., and Machine Shops	122,592	1,370	194	5,190	64	4.23	219
36	ELECTRICAL MACHINERY AND EQUIPMENT	1,729,735	4,193	71	95,504	223	5.52	226
3611	Electric Test Equipment and Measuring Instruments	75,542	222	116	6,218	10	8.23	356
3612	Power Transformers	40,719	122	- 4	3,745	8	9.20	128
3613	Switchgear and Switchboard Apparatus	61,120	226	36	5,092	13	8.33	1,570
3621	Motors, Generators, Generator Sets	130,676	293	10	4,306	17	3.30	2,976

* No plants or employees in 1957.

Appendix 4 (continued)

Standard Industrial Code	Industry	Total United States			Six Southeastern States			
		Employees	Plants	% Change 1957-67	Employees	Plants	% of U. S.	% Change 1957-67
3622	Electric Industrial Controls	60,623	142	30	655	3	1.08	878
3623	Electric Welding Apparatus	15,685	106	129	167	2	1.06	109
3624	Carbon Electrical Products	10,805	36	1,415	610	2	5.65	2,552
3629	Other Electrical Industrial Apparatus	12,491	53	- 22	480	1	3.84	- 58
3631	Major Household Cooking Equipment	21,996	57	- 6	3,178	12	14.45	- 33
3632	Home Refrigerators and Freezers	54,558	21	14	0	0	0.00	- 100
3633	Home Laundry Machines	22,640	30	- 36	0	0	0.00	- 100
3634	Minor Household Electric Appliances	43,365	114	39	4,522	14	10.43	787
3635	Vacuum Cleaners, Home	8,993	16	97	0	0	0.00	0
3636	Sewing Machines	6,534	23	- 20	750	1	11.48	*
3639	Appliances, Including Water Heaters	13,338	61	48	1,768	9	13.26	441
3641	Electric Lamp Bulbs, Tubes	29,391	55	20	1,800	3	6.12	109
3642	Lighting Fixtures	54,901	408	102	4,003	16	7.29	348
3643	Current-carrying Wiring Devices	49,528	170	74	1,300	4	2.62	333
3644	Noncurrent-carrying Wiring Devices	24,973	102	36	815	5	3.26	- 29
3651	Radio and TV Receivers	135,749	163	37	3,600	2	2.65	
3661	Telephone and Telegraph Equipment	105,454	54	69	9,794	7	9.29	578
3662	Radio and TV Transmitting Equipment, Signaling Devices	316,396	409	371	21,454	27	6.78	301
3671	Radio and TV Tubes, Receiving	23,290	15	- 39	0	0	0.00	- 100
3672	Cathode Ray Picture Tubes	24,380	16	279	0	0	0.00	0

* No plants or employees in 1957.

Appendix 4 (continued)

Standard Industrial Code	Industry	Total United States			Six Southeastern States			
		Employees	Plants	% Change 1957-67	Employees	Plants	% of U. S.	% Change 1957-67
3673	Electron Tubes, Transmitting and Industrial	22,195	40	112	725	1	3.27	142
3674	Solid State Semiconductors and Related Devices	54,631	73		0	0	0.00	
3679	Electronic Components, N.E.C.	197,415	836	163	16,199	39	8.12	517
3691	Storage Batteries	17,924	109	50	1,778	17	9.92	325
3692	Primary Batteries	9,349	24	203	1,470	6	15.72	*
3693	X-ray Apparatus and X-ray Tubes	8,262	38	44	0	0	0.00	0
3694	Electrical Equipment for Engines	64,738	97	9	775	2	1.20	*
3699	Electrical Products, N.E.C.	10,134	62	134	300	2	2.96	*
37	TRANSPORTATION EQUIPMENT	1,934,638	2,587	25	110,615	203	5.72	102
3711	Motor Vehicles	272,946	94	1	8,450	3	3.10	86
3712	Motor Vehicle Bodies, Excluding Truck Bodies	82,419	45	18	3,100	3	3.76	153
3713	Truck Bodies	26,585	239	13	2,763	29	10.39	64
3714	Motor Vehicle Parts and Accessories	352,389	662	13	9,001	35	2.55	362
3715	Truck Trailers	23,909	119	80	3,503	11	14.65	27
3716	Auto Trailer Coaches	23,060	184	105	4,176	30	18.11	1,879
3721	Aircraft	481,245	81	36	34,513	13	7.17	101
3722	Aircraft Engines and Engine Parts	205,917	118	46	4,890	8	2.37	381
3723	Aircraft Propellers	12,003	7	23	0	0	0.00	0
3729	Aircraft Parts and Subassemblies	142,598	550	52	11,016	18	7.73	65
3731	Ship Building	210,461	198	16	19,940	18	9.47	33
3732	Boat Building, Small	13,539	112	257	2,786	23	20.58	1,272
3741	Locomotives and Parts	27,155	18	43	0	0	0.00	0
3742	Railroad and Street Cars	43,749	69	9	3,220	4	7.36	181

* No plants or employees in 1957.

Appendix 4 (continued)

Standard Industrial Code	Industry	Total United States			Six Southeastern States			
		Employees	Plants	% Change 1957-67	Employees	Plants	% of U. S.	% Change 1957-67
3751	Motorcycles, Bicycles, and Parts	11,147	27	56	2,875	4	25.79	
3799	Transportation Equipment, N.E.C.	5,411	63	219	300	5	5.54	
38	INSTRUMENTS, PHOTOGRAPHIC EQUIPMENT, CLOCKS	343,369	1,074	50	10,881	34	3.17	252
3811	Laboratory, Scientific, and Engineering Instruments	87,941	193	82	4,881	7	5.55	*
3821	Measuring and Controlling Instruments, Testing Machines	68,878	280	60	1,208	10	1.75	278
3822	Automatic Temperature Controls for Appliances	34,137	59	42	1,300	3	3.81	- 23
3831	Optical Instruments	24,892	65	103	70	1	0.28	*
3841	Surgical and Medical Instruments	16,402	118	192	1,087	6	6.63	215
3842	Surgical Appliances	17,972	89	414	100	1	0.56	122
3843	Dental Equipment, Instruments, and Supplies	7,371	44	80	120	1	1.63	*
3851	Ophthalmic Goods and Instruments	7,819	37	- 11	40	1	0.51	
3861	Photographic Equipment	43,026	108	- 4	756	3	1.75	*
3871	Watches, Clocks, and Parts	32,142	68	3	2,075	4	6.46	295
3872	Watchcases	3,545	16	8	0	0	0.00	0
39	MISCELLANEOUS MANUFACTURING INDUSTRIES (METAL)	217,455	1,431	35	12,035	70	5.53	334
3911	Jewelry, Precious Metal	18,439	130	33	250	1	1.36	194
3912	Jewelers' Findings and Materials	3,219	38	37	0	0	0.00	0
3914	Silverware and Plated Ware	12,021	64	- 28	20	1	0.17	- 87
3931	Musical Instruments and Parts	18,504	72	87	1,450	3	7.84	*

* No plants or employees in 1957.

Appendix 4 (continued)

Standard Industrial Code	Industry	Total United States			Six Southeastern States			
		Employees	Plants	% Change 1957-67	Employees	Plants	% of U. S.	% Change 1957-67
3941	Toys and Games, Metal	32,025	82	82	165	2	0.52	- 34
3943	Children's Vehicles	3,960	23	- 32	485	2	12.25	116
3949	Sporting Goods, Metal	25,240	153	133	2,321	12	9.20	618
3951	Pens and Mechanical Pencils	9,450	45	38	0	0	0.00	- 100
3953	Marking Devices, Stamps	4,298	63	84	0	0	0.00	0
3961	Costume Jewelry and Novelties, Except Precious Metal	10,049	98	- 16	0	0	0.00	0
3963	Metal Buttons	1,643	13	121	0	0	0.00	0
3964	Needles, Buckles, Zippers	18,944	97	- 2	2,620	11	13.83	734
3981	Brushes, Metal Wire	7,213	55	280	338	5	4.69	*
3986	Metal Compacts, Jewelry, and Instrument Cases	3,091	23	- 50	0	0	0.00	0
3988	Metal Caskets	7,752	79	45	1,012	11	13.05	111
3993	Signs and Displays	19,395	243	83	1,572	15	8.11	498
3995	Metal Frames for Umbrellas and Parasols	1,166	12	34	0	0	0.00	0
3999	Miscellaneous Metal Products	21,046	141	16	1,802	7	8.56	2,303
	Total	8,972,403	32,284	39	466,648	1,986	5.19	105

* No plants or employees in 1957.

Source: Metalworking Marketguide, Iron Age, Philadelphia, Pa., 1957 and 1967.

Appendix 5

STEEL MILL FACILITIES IN THE SIX SOUTHEASTERN STATES, 1967

Company	Steel Furnaces: Electric No.	Electric 1/	Basic Oxygen No.	Basic Oxygen 1/	Open Hearth No.	Open Hearth 1/	Bessemer No.	Bessemer 1/	Vacuum Arc No.	Vacuum Arc 1/	Intermediate Mills: Bloom No.	Bloom 2/	Billet No.	Billet 2/	Finishing Mills: Rod No.	Rod 2/	Bar No.	Bar 2/	Strip No.	Strip 2/	Plate No.	Plate 2/	Sheet No.	Sheet 2/	Tin Plate No.	Tin Plate 2/	Structural Shape No.	Structural Shape 2/	Rail No.	Rail 2/	Cotton Tie No.	Cotton Tie 2/	Plants Making Other Finishing Mill Products: Wire No.	Nail No.	Tube No.	Forging No.	Pipe No.	Galvanized Sheet No.	Bolts and Nuts No.	Pre-engineered Buildings No.
Alabama																																								
Formed Tubes, Inc.																																		2						
Porter Co.	3	33															2	210																						
Republic Steel Corp.	2	185	2	150							1	1,332			1	280	1	119	4	2,290	1	504	1	25									1			1	1	1		
Southern Metals Co.																																		3						
Southern Electric Steel Co.	2	14															1	148																						
Southern Fabricating Co.																																		5						
U S. Steel Corp.	—	—	—	—	21	380	3	24			3	3,094	2	1,165	1	200	3	288	—	—	1	515	5	4,526	1	263	1	396	1	581	1	70	1		—	1	—	—	—	
Subtotal	7	232	2	150	21	380	3	24			4	4,426	2	1,165	2	480	7	765	4	2,290	2	1,019	6	4,551	1	263	1	396	1	581	1	70	2		10	1	1	1	1	
Florida																																								
Florida Steel Corp.	3	50															1	100																						
Ivy Steel & Wire Co.																																	1						
Mid-States Steel & Wire Co.	—	—															—	—															1	1					
Subtotal	3	50															1	100															2	1					
Georgia																																							
Atlantic Steel Co.	2	85									1	480	1	480	1	300	1	136	2	106													1	1	1			1		1
Monroe Auto Equipment Co.																																		1						
Tull Allied Metal Products Co.	—	—									—	—	—	—	—	—	—	—	—	—													—	—	1			—		—
Subtotal	2	85									1	480	1	480	1	300	1	136	2	106													1	1	3			1		1
North Carolina																																							
Florida Steel Co.	2	40															1	100																						
Vasco Metals Corp.	—	—							7	9							4	12																						
Subtotal	2	40							7	9							5	112																						
South Carolina																																							
Georgetown Steel Corp. 3/	2	60											1	200			1	200									1	4/					1	1					1	
Owen Electric Steel Co. 4/	—	—											—	—			—	—									—	—					—	—					—	
Subtotal	2	60											1	200			1	200									1	4/					1	1					1	
Tennessee																																								
Cal-Metal Corp.																																				1				
Knoxville Iron Co.	3	35															4	90																						
Poor & Co.																																					1			
Samsonite Corp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—
Subtotal	3	35															4	90																5	1	1				
Total	19	502	2	150	21	380	3	24	7	9	5	4,906	4	1,845	3	780	19	1,403	6	2,396	2	1,019	6	4,551	1	263	2	396	1	581	1	70	6	3	18	2	2	2	2	1

1/ Tons per heat.

2/ Annual rolling capacity in thousands of net tons.

3/ Under construction.

4/ Data not available.

Note: Not included in the tabulation are two companies engaged primarily in the manufacture of iron and iron products -- U. S. Pipe and Foundry Co., of Birmingham, Ala., and Woodward Iron Company, of Woodward, Ala., and Chattanooga, Tenn.

Source: Directory of Iron and Steel Works of the United States and Canada, 1967, American Iron & Steel Institute, New York, N. Y.

Appendix 6

INBOUND AND OUTBOUND RAIL SHIPMENTS OF STEEL MILL PRODUCTS IN THE SIX SOUTHEASTERN STATES, 1964

1. Inbound Steel Mill Products[1/]

From	To	Carloads	Tons	Revenue
Illinois	Alabama	10	540	$ 6,484
Illinois	Tennessee	6	238	2,454
Indiana	Alabama	12	448	6,483
Indiana	Tennessee	11	427	5,180
Kentucky	Georgia	5	240	2,669
Kentucky	Tennessee	5	272	2,175
Maryland	Alabama	8	364	6,020
Maryland	Florida	12	646	9,305
Maryland	Georgia	6	217	3,442
Maryland	North Carolina	6	297	2,817
Ohio	Alabama	33	1,668	23,215
Ohio	Florida	11	409	8,084
Ohio	Georgia	14	555	9,354
Ohio	North Carolina	10	428	6,338
Ohio	Tennessee	23	936	11,281
Pennsylvania	Alabama	13	628	10,420
Pennsylvania	Florida	16	606	12,944
Pennsylvania	Georgia	12	438	7,357
Pennsylvania	North Carolina	9	390	4,787
Pennsylvania	Tennessee	16	635	9,220
Texas	Alabama	9	458	4,896
West Virginia	Alabama	7	278	3,965
West Virginia	Florida	6	241	4,883
West Virginia	Georgia	6	333	4,809
Total		266	11,692	$168,582

2. Outbound Steel Mill Products

From	To	Carloads	Tons	Revenue
Alabama	Arkansas	5	162	$ 1,935
Alabama	Louisiana	7	344	3,241
Alabama	Texas	7	268	4,022
Alabama	Louisiana	9	450	4,635
Alabama	Mississippi	5	198	1,620
Alabama	Texas	6	259	3,514
Total		39	1,681	$ 18,967

1/ Primary iron and steel products, excluding coke oven and blast furnace products.

Source: Carload Waybill Statistics, 1964 (state-to-state distribution, traffic and revenue, one percent of terminations in 1964), Statement SS-6, Interstate Commerce Commission, Washington, D. C., August 1967.

Appendix 7

RAILROAD RATES
(in cents per 100 lbs.)

To:	Minimum Weight (in thousands of lbs.)	From: Atlanta Ga.	Bethlehem Pa.	Birmingham Ala.	Buffalo N. Y.	Detroit Mich.	Middleton (Dayton) O.	Pittsburgh Pa.	Sparrows Point (Baltimore) Md.	Weirton W. Va.
Alabama										
Birmingham	40	31½	102	-	99	87	71	90	96	81
	80	28½	92	-	89	78	63½	81	87	73
	100	25½	82	-	79	70	56½	72	77	64½
Huntsville	40	37½	99	26½	96	82	64½	85	93	75
	80	33½	89	24½	87	74	58½	77	84	68
	100	30½	79	21½	77	65½	51½	68	74	59½
Mobile	40	49½	121	42½	119	108	91	112	115	102
	80	44½	109	38½	107	97	82	101	104	92
	100	39½	97	34½	95	87	73	90	93	82
Florida										
Arcadia	40	71	116	80	130	124	114	123	113	124
	80	63½	105	72	117	112	103	111	102	112
	100	56½	93	64½	104	99	91	99	91	99
Jacksonville	40	48½	102	60½	119	114	96	110	94	108
	80	43½	92	54½	107	103	87	99	85	97
	100	38½	82	48½	95	91	77	88	75	87
Lakeland	40	62½	116	75	126	121	108	121	107	118
	80	56½	105	67½	114	109	97	109	97	106
	100	50½	93	60½	101	97	87	97	86	95
Miami	40	82	124	92	135	130	122	128	121	128
	80	74	112	83	122	117	110	115	109	115
	100	65½	99	74	108	104	98	103	98	103
Tampa	40	64½	116	75	128	122	110	121	109	118
	80	58½	105	67½	115	110	99	109	99	106
	100	51½	93	60½	103	98	88	97	88	95

Appendix 7 (continued)

To:	Minimum Weight (in thousands of lbs.)	From: Atlanta Ga.	Bethlehem Pa.	Birmingham Ala.	Buffalo N. Y.	Detroit Mich.	Middleton (Dayton) O.	Pittsburgh Pa.	Sparrows Point (Baltimore) Md.	Weirton W. Va.
Georgia										
Athens	40	21½	90	39½	104	91	76	93	81	87
	80	19½	81	35½	94	82	69	84	73	78
	100	17½	72	32½	83	73	60½	75	64½	70
Atlanta	40		97	33½	102	90	71	94	87	85
	80		88	29½	92	80	63½	85	78	76
	100		77	26½	81	72	56½	75	69	67½
Augusta	40	31½	88	50½	106	94	81	91	80	93
	80	28½	79	45½	96	85	73	82	72	84
	100	25½	71	40½	85	75	64½	73	64½	75
Carrollton	40	19½	99	29½	99	87	71	90	91	82
	80	17½	89	25½	89	78	63½	81	81	74
	100	15½	79	21½	79	70	56½	72	73	65½
Columbus	40	25½	102	30½	108	94	79	98	94	90
	80	23½	92	27½	97	85	71	88	85	81
	100	20½	82	24½	87	75	62½	79	75	72
Rome	40	19½	94	28½	94	82	62½	85	88	78
	80	17½	85	25½	85	74	56½	77	79	70
	100	15½	75	23½	75	65½	50½	68	70	62½
Savannah	40	38½	91	59½	112	102	90	98	84	101
	80	37½	82	53½	101	92	81	88	75	91
	100	33½	73	48½	90	82	72	79	66½	81
Vidalia	40	32½	96	50½	114	101	85	99	88	96
	80	29½	87	45½	103	91	77	89	79	87
	100	26½	77	40½	91	81	68	79	70	77
West Point (LaGrange)	40	21½	99	33½	104	91	76	94	91	87
	80	15½	89	30½	94	82	69	85	81	78
	100	17½	79	26½	83	73	60½	75	73	70

Appendix 7 (continued)

To:	Minimum Weight (in thousands of lbs.)	From: Atlanta Ga.	Bethlehem Pa.	Birmingham Ala.	Buffalo N. Y.	Detroit Mich.	Middleton (Dayton) O.	Pittsburgh Pa.	Sparrows Point (Baltimore) Md.	Weirton W. Va.
North Carolina										
Gastonia	40	41½	78	56½	96	91	78	81	62½	88
	80	37½	71	51½	87	81	71	73	56½	79
	100	33½	62½	45½	77	73	62½	64½	50½	70
Greensboro	40	49½	62½	71	85	85	75	71	50½	84
	80	44½	56½	63½	77	77	68	63½	45½	76
	100	39½	50½	56½	68	68	59½	56½	40½	67
Raleigh	40	55½	62½	77	85	88	78	73	48½	87
	80	50½	56½	70	77	79	70	65½	43½	78
	100	44½	50½	61½	68	71	62½	58½	39½	70
Winston-Salem	40	49½	67	69	87	84	73	73	53½	82
	80	44½	59½	61½	78	76	65½	65½	48½	74
	100	39½	53½	55½	70	67	58½	58½	43½	65½
South Carolina										
Columbia	40	37½	82	56½	101	93	79	87	73	90
	80	33½	74	51½	91	84	71	78	65½	81
	100	30	65½	45½	81	75	62½	70	58½	72
Greenville	40	29½	82	48½	99	88	75	87	73	85
	80	26½	74	43½	89	79	68	78	65½	77
	100	23½	65½	39½	79	71	59½	70	58½	68
Spartanburg	40	32½	81	51½	96	85	71	84	69	82
	80	29½	73	46½	87	77	63½	76	61½	74
	100	26½	64½	41½	77	68	56½	67	55½	65½

Appendix 7 (continued)

To:	Minimum Weight (in thousands of lbs.)	From: Atlanta Ga.	Bethlehem Pa.	Birmingham Ala.	Buffalo N. Y.	Detroit Mich.	Middleton (Dayton) O.	Pittsburgh Pa.	Sparrows Point (Baltimore) Md.	Weirton W. Va.
Tennessee										
Chattanooga	40	28½	91	30½	88	76	54½	79	85	71
	80	26½	82	27½	79	69	49½	71	76	63½
	100	22½	73	24½	71	60½	43½	62½	67½	56½
Knoxville	40	33½	82	43½	85	71	48½	76	75	64½
	80	30½	74	39½	77	63½	43½	69	67½	58½
	100	26½	65½	35½	68	56½	38½	60½	60½	51½
Memphis	40	59½	119	43½	102	87	73	94	111	91
	80	53½	108	39½	92	78	65½	85	100	81
	100	48½	96	35½	81	69	58½	75	90	73
Nashville	40	44½	102	35½	85	73	49½	76	96	60½
	80	40½	92	32½	77	65½	44½	69	87	54½
	100	35½	82	27½	68	58½	39½	60½	77	48½

Source: Southern Railway System, Washington, D. C.

Appendix 8

FERROUS SCRAP PRICES IN MAJOR U. S. CITIES

Effective March 31, 1969
(in dollars per gross ton)

	No. 1 Heavy Melting	No. 2 Heavy Melting	No. 1 Dealer Bundles	No. 2 Bundles	No. 1 Busheling	No. 1 RR Heavy Melting
Birmingham	19.00 to 20.00	19.00 to 20.00	20.00 to 21.00	19.00 to 20.00	27.00 to 28.00	21.00 to 22.00
Boston	17.00 to 18.00	12.00 to 13.00	19.00 to 20.00	12.00 to 13.00	19.00 to 20.00	- -
Buffalo	19.00 to 20.00	18.00 to 19.00	19.00 to 20.00	16.00 to 17.00	19.00 to 20.00	- -
Chicago	25.00 to 26.00	21.00 to 22.00	26.00 to 27.00	20.00 to 21.00	26.00 to 27.00	26.00 to 27.00
Cincinnati	24.00 to 25.00	22.50 to 23.50	22.50 to 23.50	16.00 to 17.00	- -	- -
Cleveland	26.00 to 27.00	16.00 to 17.00	26.00 to 27.00	20.00 to 21.00	27.00 to 28.00	30.00 to 31.00
Detroit	20.50 to 21.50	15.00 to 16.00	21.50 to 22.50	17.00 to 18.00	20.50 to 21.50	- -
Houston	27.50 to 28.00	24.50 to 25.00	- -	19.50 to 20.00	- -	- -
Los Angeles	- 28.00	- 25.00	- 24.00	- 19.00	- -	- -
New York	19.00 to 21.00	15.00 to 17.00	- -	10.00 to 11.00	- -	- -
Philadelphia	26.00 to 27.00	22.00 to 23.00	29.00 to 30.00	21.00 to 22.00	29.00 to 30.00	- -
Pittsburgh	26.00 to 27.00	24.00 to 25.00	28.00 to 29.00	22.00 to 23.00	30.00 to 31.00	31.00 to 32.00
St. Louis	23.00 to 24.00	19.00 to 20.00	24.00 to 25.00	18.50 to 19.50	- -	25.50 to 26.50
San Francisco	- 30.00	- 27.00	- 24.00	- 18.00	- -	- -
Seattle	- 31.00	- 27.00	- -	- 24.00	- -	- -
Youngstown	28.00 to 29.00	22.00 to 23.00	29.00 to 30.00	22.00 to 23.00	- -	- -

Source: Iron Age, April 3, 1969.

Appendix 9

STEEL SCRAP SUPPLY[1/] AND CONSUMPTION BY REGIONS
IN THE UNITED STATES AND IN THE SIX SOUTHEASTERN STATES, 1967
(in thousands of short tons)

Region	Home Production	Receipts from Dealers and All Others	Total New Supply	Shipments[2/]	New Supply Available for Consumption	Consumption
New England	251	280	531	15	516	527
Middle Atlantic	14,675	8,745	23,420	1,874	21,546	21,620
East North Central	25,103	18,044	43,147	2,426	40,721	40,737
West North Central	797	1,443	2,240	40	2,200	2,323
South Atlantic	3,951	2,511	6,462	276	6,186	6,265
East South Central	2,924	2,557	5,481	320	5,161	5,195
West South Central	1,628	1,615	3,243	176	3,067	3,150
Rocky Mountain	1,262	546	1,803	60	1,748	1,788
Pacific Coast	1,721	2,243	3,964	143	3,821	3,755
U. S. Total[3/]	52,312	37,984	90,296	5,330	84,966	85,361
Six Southeastern States						
Alabama	1,932	1,558	3,490	232	3,258	3,247
Florida	14	121	135	-	135	131
Georgia	117	336	453	2	451	455
North Carolina	39	158	197	-	197	203
South Carolina	15	32	47	-	47	52
Tennessee	176	213	389	10	379	378
Total	2,293	2,418	4,711	244	4,467	4,466

1/ New supply available for consumption is a net figure computed by adding home production to receipts from dealers and all others and deducting scrap shipped, transferred, or otherwise disposed of during the year. The plus or minus difference in stock levels at the beginning and end of year is not taken into consideration.

2/ Include scrap shipped, transferred, or otherwise disposed of during the year.

3/ Detail may not add to totals due to individual rounding.

Source: U. S. Department of the Interior, Bureau of Mines, Minerals Yearbook, 1967.

Appendix 10

REPRESENTATIVE IRON ORE PRICES, 1969

I. Lake Superior Iron Ores

Prices effective for the 1969 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.

Mesabi non-Bessemer	$10.55
Coarse (½" and up)	11.35
Fines (under ½")	10.10
Mesabi Bessemer	10.70
Old Range non-Bessemer	10.80
Old Range Bessemer	10.95
Open hearth lump	12.60
High phosphorus	10.55
Pellets (per unit[1/] of iron content)	0.252

1/ A unit equals 1% of iron content per gross ton.

Source: Steel, April 14, 1969.

II. Foreign Iron Ores

Brazilian ore, 68-69% iron, Atlantic port	
Run of mine	$ 8.50
Lump	10.40
Chilean, 62-65% iron, c.i.f. Atlantic ports (per unit of iron content)	0.22
Swedish pellets, 68% min., Atlantic shipping ports	Nom. 14.00
Venezuelan ore, Orinoco No. 1, 58% iron, f.o.b. Puerto Ordaz	7.88

Sources: American Metal Market, March 20, 1969; Steel, April 14, 1969.

III. Foreign Ores, f.o.b. Mobile

Representative prices quoted by southern steel mill on shipments of less than 100,000 gross tons.

Quebec, Canada	
QCM, 65% iron concentrate	$13.90
Pellets (prepared ½" balls)	16.50
Peruvian pellets (per unit of iron content)	.25
total iron 64%	16.00
Venezuelan run of mine, 60% iron natural	12.50

Appendix 11

ECONOMIC GROWTH INDICATORS IN GEORGIA AND BORDERING STATES

Appendix Table 11-A

POPULATION GROWTH IN THE SIX-STATE AREA, 1950-1980
(in thousands)

	1950	1960	1966	1975	1980	Change, 1966-1980 No.	Change, 1966-1980 %
Alabama	3,062	3,267	3,511	3,938	4,255	744	21.2
Florida	2,771	4,952	5,893	7,552	8,648	2,755	46.7
Georgia	3,445	3,943	4,445	5,147	5,593	1,148	25.8
North Carolina	4,062	4,556	4,974	5,618	6,048	1,074	21.6
South Carolina	2,117	2,383	2,589	2,889	3,117	528	20.4
Tennessee	3,292	3,567	3,866	4,349	4,658	792	20.5
Six-State Total	18,749	22,668	25,278	29,493	32,319	7,041	27.9
United States	151,326	179,323	195,936	222,805	242,311	46,375	23.7
Six-State % of U. S.	12.4	12.6	12.9	13.2	13.3		

Source: U. S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-25, No. 373 and No. 384.

Appendix Table 11-B

NONAGRICULTURAL EMPLOYMENT, 1950-1966
(in thousands)

	1950	1960	1966	Change, 1950-1966 No.	Change, 1950-1966 %	1966 % of U. S.
Alabama	619.6	776.4	929.3	309.7	50.0	1.46
Florida	704.4	1,320.6	1,717.8	1,013.4	143.9	2.69
Georgia	806.6	1,051.1	1,322.8	516.2	64.0	2.07
North Carolina	927.8	1,195.5	1,501.8	574.0	61.9	2.35
South Carolina	461.4	582.5	734.3	272.9	59.1	1.15
Tennessee	759.3	925.5	1,188.7	429.4	56.6	1.86
Total	4,279.1	5,851.6	7,394.7	3,115.6	72.8	11.58
United States	45,222	54,234	63,864	18,642	41.2	
Six-State % of U. S.	9.5	10.8	11.6			

Source: U. S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings Statistics for States and Areas, 1939-66.

Appendix Table 11-C

MANUFACTURING EMPLOYMENT, 1950-1966
(in thousands)

	1950	1960	1966	Change, 1950-1966 No.	Change, 1950-1966 %	1966 % of U. S.
Alabama	216.1	237.0	292.5	76.4	35.4	1.53
Florida	102.3	206.7	276.2	173.9	170.0	1.45
Georgia	286.5	340.8	426.8	140.3	49.0	2.24
North Carolina	418.3	509.3	635.8	217.5	52.0	3.33
South Carolina	210.4	244.8	313.9	103.5	49.2	1.65
Tennessee	249.9	315.6	426.3	176.4	70.6	2.23
Total	1,483.5	1,854.2	2,371.5	888.0	60.0	12.43
United States	15,241	16,796	19,081	3,840	25.2	
Six-State % of U. S.	9.7	11.0	12.4			

Source: U. S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings Statistics for States and Areas, 1939-66.

Appendix Table 11-D

CONSTRUCTION EMPLOYMENT, 1950-1966
(in thousands)

	1950	1960	1966	Change, 1950-1966 No.	Change, 1950-1966 %	1966 % of U. S.
Alabama	28.2	43.2	55.1	26.9	95.4	1.68
Florida	66.8	121.8	136.5	69.7	104.3	4.16
Georgia	40.3	55.3	70.9	30.6	75.9	2.16
North Carolina	48.0	65.2	89.9	41.9	87.3	2.74
South Carolina	24.3	34.6	48.5	24.2	99.6	1.48
Tennessee	46.2	46.8	64.3	18.1	39.2	1.96
Total	253.8	366.9	465.2	211.4	83.3	14.18
United States	2,333	2,885	3,281	948	40.6	
Six-State % of U. S.	10.9	12.7	14.2			

Source: U. S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings Statistics for States and Areas, 1939-66.

Appendix Table 11-E

TOTAL PERSONAL INCOME, 1950-1966
(in millions of dollars)

	1950	1960	1966	Change, 1950-1966 No.	Change, 1950-1966 %	1966 % of U. S.
Alabama	2,691	4,876	7,254	4,563	169.6	1.25
Florida	3,599	9,746	15,410	11,851	329.3	2.65
Georgia	3,574	6,489	10,579	7,005	196.0	1.82
North Carolina	4,219	7,142	11,321	7,102	168.3	1.95
South Carolina	1,886	3,298	5,310	3,424	181.5	.91
Tennessee	3,295	5,521	8,611	5,316	161.3	1.48
Total	19,264	37,072	58,485	39,221	203.6	10.08
United States	227,228	398,725	580,483	353,255	155.5	
Six-State % of U. S.	8.5	9.3	10.1			

Source: U. S. Department of Commerce, Survey of Current Business.

Appendix Table 11-F

PER CAPITA PERSONAL INCOME, 1950-1966

	1950	1960	1966	Change, 1950-1966 No.	Change, 1950-1966 %	1966 % of U. S.
Alabama	$ 880	$1,488	$2,066	$1,186	134.8	69.7
Florida	1,281	1,950	2,614	1,333	104.1	88.2
Georgia	1,034	1,639	2,379	1,345	130.1	80.3
North Carolina	1,037	1,561	2,277	1,240	119.6	76.8
South Carolina	893	1,377	2,052	1,159	111.8	69.3
Tennessee	994	1,543	2,227	1,233	124.0	75.2
Six-State Average	$1,020	$1,593	$2,269	$1,249	122.5	76.6
U. S. Average	$1,496	$2,215	$2,963	$1,467	98.1	
Six-State % of U. S.	68.2	71.9	76.6			

Source: U. S. Department of Commerce, Survey of Current Business.

Appendix Table 11-G

TOTAL LONG-TERM SAVINGS OF INDIVIDUALS, 1950-1966
(in millions of dollars)

	1950	1960	1966	Change, 1950-1966 No.	Change, 1950-1966 %	1966 % of U. S.
Alabama	1,010	2,461	4,307	3,297	326	.92
Florida	1,547	6,709	12,408	10,861	702	2.65
Georgia	1,494	3,695	6,615	5,121	343	1.41
North Carolina	1,681	3,819	6,855	5,174	308	1.47
South Carolina	736	1,732	2,805	2,069	281	.60
Tennessee	1,410	3,335	5,812	4,402	312	1.24
Total	7,878	21,751	38,802	30,924	393	8.30
United States	128,071	271,677	467,566	339,495	265	
Six-State % of U. S.	6.2	8.0	8.3			

Source: Federal Reserve Bank of Atlanta, Research Department.

Appendix Table 11-H

WHOLESALE TRADE, 1954-1963

	1954		1958		1963		Sales Increase 1954-1963		1963 %
	Establish-ments	Sales (millions)	Establish-ments	Sales (millions)	Establish-ments	Sales (millions)	Millions	%	of U. S.
Alabama	2,818	$ 2,327	3,393	$ 2,853	3,935	$ 3,395	$ 1,068	45.9	.95
Florida	5,309	3,402	7,232	5,512	8,896	7,487	4,085	120.1	2.09
Georgia	4,496	4,548	5,445	5,741	6,530	8,100	3,552	78.1	2.26
North Carolina	4,752	4,184	5,741	5,026	6,615	6,983	2,799	66.9	1.95
South Carolina	2,016	1,341	2,387	1,605	2,738	1,993	652	48.6	.56
Tennessee	3,877	4,564	4,490	5,153	5,100	6,677	2,113	46.9	1.86
Total	23,268	$ 20,366	28,688	$ 25,890	33,814	$ 34,635	$ 14,269	61.3	9.67
United States	253,096	$235,651	287,043	$285,727	308,177	$358,386	$122,735	52.1	
Six-State % of U. S.	9.2	8.6	10.0	9.1	11.0	9.7			

Source: U. S. Bureau of the Census, Census of Business, 1954-1963.

Appendix Table 11-I

RETAIL SALES, 1950-1966
(in millions of dollars)

	1950	1960	1966	Change, 1950-1966 No.	Change, 1950-1966 %	1966 % of U. S.
Alabama	1,743	2,922	4,040	2,297	132	1.34
Florida	2,810	6,783	10,226	7,416	264	3.39
Georgia	2,311	3,924	5,911	3,600	156	1.96
North Carolina	2,624	4,360	6,166	3,542	135	2.04
South Carolina	1,258	1,908	2,849	1,591	126	.94
Tennessee	2,214	3,484	5,205	2,991	135	1.73
Total	12,960	23,381	34,397	21,437	165	11.40
United States	140,691	219,837	301,526	160,835	114	
Six-State % of U. S.	9.2	10.6	11.4			

Source: Copyright Sales Management, Survey of Buying Power, 1951-1967; further reproduction is forbidden.

Appendix Table 11-J

VALUE ADDED BY MANUFACTURE, 1950-1965
(in millions of dollars)

	1950	1960	1965	Change, 1950-1966 No.	Change, 1950-1966 %	1965 % of U. S.
Alabama	1,040	1,958	3,139	2,099	202	1.39
Florida	449	1,797	2,671	2,222	495	1.19
Georgia	1,236	2,497	4,061	2,825	229	1.80
North Carolina	1,863	3,805	5,509	3,646	196	2.44
South Carolina	858	1,719	2,737	1,879	219	1.21
Tennessee	1,174	2,586	4,096	2,922	249	1.82
Total	6,620	14,362	22,213	15,593	236	9.85
United States	89,750	163,999	225,366	135,616	151	
Six-State % of U. S.	7.4	8.8	9.9	11.5		

Source: U. S. Bureau of the Census, Annual Survey of Manufactures, 1950-1965.

Appendix Table 11-K

EXPENDITURES FOR NEW MANUFACTURING PLANT AND EQUIPMENT, 1951-1965
(in millions of dollars)

	1951	1960	1965	Change, 1951-1965 No.	Change, 1951-1965 %	1965 % of U. S.
Alabama	97	202	391	294	303.1	2.36
Florida	76	153	286	210	276.3	1.73
Georgia	115	173	307	192	167.0	1.86
North Carolina	166	240	514	348	209.6	3.11
South Carolina	131	144	282	151	115.3	1.71
Tennessee	114	217	385	271	237.7	2.33
Total	699	1,129	2,165	1,466	209.7	13.09
United States	7,782	10,070	16,534	8,752	112.5	
Six-State % of U. S.	9.0	11.2	13.1			

Source: U. S. Bureau of the Census, Annual Survey of Manufactures, 1951-1965.

Appendix Table 11-L

INSTALLED CAPACITY OF ELECTRIC UTILITIES, 1950-1966
(in thousands of kilowatts)

	1950	1960	1966	Change, 1950-1966 No.	Change, 1950-1966 %	1966 % of U. S.
Alabama	1,690	4,700	8,636	6,946	411.0	3.48
Florida	999	3,992	9,005	8,006	801.4	3.63
Georgia	1,156	2,236	4,158	3,002	259.7	1.68
North Carolina	1,760	4,397	7,106	5,346	303.8	2.87
South Carolina	847	2,249	2,859	2,012	238.6	1.15
Tennessee	1,670	7,521	8,487	6,817	408.2	3.42
Total	8,122	25,095	40,251	32,129	395.6	16.23
United States	68,919	168,568	247,843	178,924	259.6	
Six-State % of U. S.	11.8	14.9	16.2			

Source: U. S. Bureau of the Census, Statistical Abstract of the United States, 1967.

Appendix Table 11-M

REGISTRATION OF NEW VEHICLES, 1959-1966

	Automobiles				
			Change, 1959-1966		1966 %
	1959	1966	No.	%	of U. S.
Alabama	82,114	129,693	47,579	57.9	1.44
Florida	217,014	181,269	- 35,745	- 16.5	2.01
Georgia	105,747	329,216	223,469	211.3	3.65
North Carolina	111,941	196,040	84,099	75.1	2.18
South Carolina	52,570	96,381	43,811	83.3	1.07
Tennessee	87,650	155,617	67,967	77.5	1.73
Total	657,036	1,088,216	431,180	65.6	12.08
United States	6,026,500	9,008,488	2,981,988	49.5	
Six-State % of U. S.	10.9	12.1			

	Trucks				
			Change, 1959-1966		1966 %
	1959	1966	No.	%	of U. S.
Alabama	19,799	30,018	10,219	51.6	1.86
Florida	30,914	40,886	9,972	32.3	2.54
Georgia	21,058	45,905	24,847	118.0	2.85
North Carolina	24,208	44,296	20,008	83.3	2.75
South Carolina	10,701	20,260	9,559	89.3	1.26
Tennessee	17,828	33,829	16,001	99.8	2.10
Total	124,508	215,194	90,686	72.8	13.36
United States	940,181	1,610,450	670,269	71.3	
Six-State % of U. S.	13.2	13.4			

Source: Ward's Automotive Yearbook, 1960-1967.